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Title: Results of the May 24-27, 1994 Air
Emission Testing at the Northshore
Mining Facility in Silver Bay, MN

Interpoll Laboratories, IncInterpoll
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Laboratories, Inc

July 1994

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Reference
Report Sect. 4
Reference 51

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RESULTS OF THE MAY 24 - 27, 1994
AIR EMISSION TESTING AT THE
CYPRUS NORTSHORE MINING FACILITY IN
SILVER BAY, MINNESOTA

Submitted to:

CYPRUS NORTSHORE MINING
10 Outer Drive
Silver Bay, Minnesota 55614

Attention:

Dennis Wagner

Approved by:

Daniel Despen
Manager
Stationary Source Testing Department

Report Number 4-2971
July 6, 1994
SP/slp

AP-42 Section 11.23
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ABBREVIATIONS

ACFM	actual cubic feet per minute
cc (ml)	cubic centimeter (milliliter)
DSCFM	dry standard cubic foot of dry gas per minute
DSML	dry standard milliliter
DEG-F (°F)	degrees Fahrenheit
DIA.	diameter
FP	finished product for plant
FT/SEC	feet per second
g	gram
GPM	gallons per minute
GR/ACF	grains per actual cubic foot
GR/DSCF	grains per dry standard cubic foot
g/dscm	grams per dry standard cubic meter
HP	horsepower
HRS	hours
IN.	inches
IN.HG.	inches of mercury
IN.WC.	inches of water
LB	pound
LB/DSCF	pounds per dry standard cubic foot
LB/HR	pounds per hour
LB/10 ⁶ BTU	pounds per million British Thermal Units heat input
LB/MMBTU	pounds per million British Thermal Units heat input
LTPD	long tons per day
MW	megawatt
mg/Nm ³	milligrams per dry standard cubic meter
ug/Nm ³	micrograms per dry standard cubic meter
microns (um)	micrometer
MIN.	minutes
ng	nanograms
ohm-cm	ohm-centimeter
PM	particulate matter
PPH	pounds per hour
PPM	parts per million
ppmC	parts per million carbon
ppm,d	parts per million, dry
ppm,w	parts per million, wet
ppt	parts per trillion
PSI	pounds per square inch
SQ.FT.	square feet
TPD	tons per day
ug	micrograms
v/v	percent by volume
w/w	percent by weight
<	≤ (when following a number)

Standard conditions are defined as 68°F (20°C) and 29.92 IN. of mercury pressure.

INTERPOLL LABORATORIES, INC.

(612) 786-6020

Certifications Required For Performance Test Reports

Note: All performance test reports must contain a certification by the responsible parties that the test results have been reported accurately, that the field data is a true representation of the sampling procedures, and that the process data is a true indicator of the operating parameters of the emissions unit at the time of the performance test. (Ref. Minn. Rules pt. 7017.2040). Performance test results will not be accepted without certification of the report.

1. Certification of sampling procedures by the team leader of the personnel conducting the sampling procedures:

"I certify under penalty of law that the sampling procedures were performed in accordance with the approved test plan and that the data presented in this test report are, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature: [Signature]
Title: Field Eng

Printed Name of Person Signing: Robert W. Schaefer
Date: 5-25-94

2. Certification of analytical procedures by the person responsible for the laboratory analysis of field samples:

"I certify under penalty of law that the analytical procedures were performed in accordance with the requirements of the test methods and that the data presented for use in the test report were, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature: [Signature]
Title: Field Eng

Printed Name of Person Signing: Robert W. Schaefer
Date: 5-25-94

3. Certification of test report by the senior staff person at the testing company who is responsible for compiling and checking the test report:

"I certify under penalty of law that this test report and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the test information submitted. Based on my inquiry of the person or persons who performed sampling and analysis relating to the performance test, the information submitted in this test report is, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature: [Signature]
Title: Mgr. Laboratory Service

Printed Name of Person Signing: Daniel J. Desper
Date: 7/11/94

4. Certification of test report by owner or operator of the emission facility:

"I certify under penalty of law that the information submitted in this test report accurately reflects the operating conditions at the emission facility during this performance test and describes the date and nature of all operational and maintenance activities that were performed on process and control equipment during the month prior to the performance test. Based on my inquiry of the person or persons who performed the operational and maintenance activities, the information submitted in this test report is, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature: _____
Title: _____

Printed Name of Person Signing: _____
Date: _____

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Note: All performance test reports must contain a certification by the responsible parties that the test results have been reported accurately, that the field data is a true representation of the sampling procedures, and that the process data is a true indicator of the operating parameters of the emissions unit at the time of the performance test. (Ref. Minn. Rules pt. 7017.2040). Performance test results will not be accepted without certification of the report.

1. Certification of sampling procedures by the team leader of the personnel conducting the sampling procedures:

"I certify under penalty of law that the sampling procedures were performed in accordance with the approved test plan and that the data presented in this test report are, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature: [Signature] Printed Name of Person Signing: E. J. R. R. R. R. R.
Title: [Title] Date: 5-20-94

2. Certification of analytical procedures by the person responsible for the laboratory analysis of samples:

"I certify under penalty of law that the analytical procedures were performed in accordance with the requirements of the test methods and that the data presented for use in the test report were, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature: David Schaefer Printed Name of Person Signing: David Schaefer
Title: QA OFF. Date: 7/11/94

3. Certification of test report by the senior staff person at the testing company who is responsible for compiling and checking the test report:

"I certify under penalty of law that this test report and all attachments were prepared under my supervision in accordance with a system designed to assure that qualified personnel properly evaluated the test information submitted. Based on my inquiry of the person or persons who sampled and analyzed the information submitted in this test report, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed below."

Signature: [Signature] Printed Name of Person Signing: Daniel J.
Title: Mgr. Stationary Source Date: 7/11/94

4. Certification of test report by owner or operator of the emission facility:

"I certify under penalty of law that the information submitted in this test report accurately describes the operating conditions at the emission facility during this performance test and describes all of the operational and maintenance activities that were performed on process and controlled the month prior to the performance test. Based on my inquiry of the person or persons who performed the operational and maintenance activities, the information submitted in this test report is, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature: _____ Printed Name of Person Signing: _____
Title: _____ Date: _____

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(612) 786-6020

Certifications Required For Performance Test Reports

Note: All performance test reports must contain a certification by the responsible parties that the test results have been reported accurately, that the field data is a true representation of the sampling procedures, and that the process data is a true indicator of the operating parameters of the emissions unit at the time of the performance test. (Ref. Minn. Rules pt. 7017.2040). Performance test results will not be accepted without certification of the report.

1. Certification of sampling procedures by the team leader of the personnel conducting the sampling procedures:

"I certify under penalty of law that the sampling procedures were performed in accordance with the approved test plan and that the data presented in this test report are, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature: Mark Kachler Printed Name of Person Signing: Mark Kachler
Title: Field Engineer Date: 5-25-94

2. Certification of analytical procedures by the person responsible for the laboratory analysis of field samples:

"I certify under penalty of law that the analytical procedures were performed in accordance with the requirements of the test methods and that the data presented for use in the test report were, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature: David J. Schneider Printed Name of Person Signing: David Schneider
Title: QA Officer Date: 7/11/94

3. Certification of test report by the senior staff person at the testing company who is responsible for compiling and checking the test report:

"I certify under penalty of law that this test report and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the test information submitted. Based on my inquiry of the person or persons who performed sampling and analysis relating to the performance test, the information submitted in this test report is, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature: Daniel J. Despre Printed Name of Person Signing: Daniel J. Despre
Title: Managing Partner Date: 7/11/94

4. Certification of test report by owner or operator of the emission facility:

"I certify under penalty of law that the information submitted in this test report accurately reflects the operating conditions at the emission facility during this performance test and describes the date and nature of all operational and maintenance activities that were performed on process and control equipment during the month prior to the performance test. Based on my inquiry of the person or persons who performed the operational and maintenance activities, the information submitted in this test report is, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below."

Signature: _____ Printed Name of Person Signing: _____
Title: _____ Date: _____

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1 INTRODUCTION

During May 24 - 27, 1994 Interpoll Laboratories personnel conducted the following air emission tests at the Cyprus Northshore Mining Facility in Silver Bay, Minnesota:

Source	Parameters	Date
No. 12 Pelletizer Hood Exhaust Inlet	PM,SO ₂ ,NO _x	5-24-94 (2 Conditions)
No. 12 Pelletizer Hood Exhaust Stack	PM,SO ₂ ,NO _x	5-24-94 (2 Conditions)
No. 12 Pelletizer North Rotoclone Inlet	PM	5-24-94
No. 12 Pelletizer North Rotoclone Stack	PM,VE	5-24-94
No. 12 Waste Gas Inlet	PM,SO ₂ ,NO _x	5-25-94 (2 Conditions)
No. 12 Pelletizer Waste Gas Stack	PM,SO ₂ ,NO _x	5-25-94 (2 Conditions)
No. 1104 Pelletizer Waste Gas Stack	PM,SO ₂ ,NO _x	5-26-94
No. 1105 Pelletizer Waste Gas Stack	PM,SO ₂ ,NO _x	5-26-94
No. 2 Boiler Stack	PM,SO ₂ ,NO _x	5-27-94
Dry Cobber Stack	PM,VE	5-26-94
No. 2 Fine Crusher Stack	PM,VE	5-25-94
Bin Storage Stack	PM,VE	5-25-94

On-site testing was performed by Ron Rosenthal, Mark Kaehler, Duane Van Hoever, Scott Bainville, Bob Aschenbach, Ed Juers, Ed Trowbridge, Dave Vaaler, Dennis Marso, and Ken Nuessmeier. Coordination between testing activities and plant operation was provided by Dennis Wagner of Cyprus Northshore Mining. The tests were not witnessed by a member of the Minnesota Pollution Control Agency.

Particulate evaluations were performed in accordance with EPA Methods 1 - 5, CFR Title 40, Part 60, Appendix A (revised July 1, 1993). A preliminary determination of the gas linear velocity profile was made at each test site before the first particulate determination to allow selection of the appropriate nozzle diameter required for isokinetic sample withdrawal. An Interpoll Labs sampling train which meets or exceeds specifications in the above-cited reference was used to extract particulate samples by means of a heated glass-lined probe. Wet catch samples were collected in the back half of the Method 5 sampling train and

analyzed as per Minnesota Rules, Part 7011.0725.

Sulfur dioxide, oxides of nitrogen, oxygen, and carbon dioxide concentrations were determined in accordance with Methods 6C, 7E, and 3A (Ibid). A slip stream of sample gas was withdrawn from the exhaust gas stream using a heated stainless steel probe equipped with a filter to remove interfering particulate material. The particulate-free gas was transported to the analyzers by means of a heat-traced probe and filter assembly. After passing through the filter, the gas passed through a chilled condenser-type moisture removal system. The particulate-free dry gas was then transported to the analyzers with the excess exhausted to the atmosphere through a calibrated orifice which was used to ensure that the flow from the stack exceeds the requirements of the analyzers. A three-way valve on the probe was used to introduce standard gas for the "system bias check".

The analog response of each analyzer was recorded with a strip chart recorder. The SO₂, NO_x, O₂ and CO₂ analyzers were calibrated with National Specialty Gases (EPA Protocol 1), Scott Specialty, and Linde standard gases. The instrument was calibrated before and after each run as per EPA Method 6C, 7E, and 3A. The sample probe was moved through a three-point traverse (1/6, 3/6, 5/6 of the stack diameter) to measure sulfur dioxide and oxides of nitrogen concentrations.

Testing on the Pelletizer Hood Exhaust Inlet was conducted from a set of four test ports situated horizontally on a vertical section of rectangular ducting. Testing on the Hood Exhaust Stack was conducted from two test ports oriented at 90 degrees. The test port location meets EPA specifications. A 24-point traverse was used at each test site. Each traverse point was sampled for 2.5 minutes for a total of 60 minutes per run.

Testing on the Waste Gas Inlet was conducted from a set of five test ports situated horizontally on a vertical section of rectangular ducting. Testing on the Waste Gas Stack was conducted from two test ports oriented at 90 degrees. The test port location meets EPA specifications. A 25-point traverse was used at the Inlet test site and a 24-point traverse was used at the stack. Each point was sampled for 2.5 minutes for a total of 62.5 minutes at the Inlet and 60 minutes at the stack.

Parameter	Limit	ELECTRICS	ELECTRICS
		ON	OFF

SOURCE NO. 101 (REMOVAL BASED ON LB/HR)

PM Removal Efficiency (%)	N/A	98	98
SO ₂ Removal Efficiency . . . (%)	N/A	90	95

No. 12 Pelletizer Hood Exhaust Inlet

Particulate (GR/DSCF)	N/A	0.141	0.132
Sulfur Dioxide (ppm,d)	N/A	9	14
Oxides of Nitrogen . . . (ppm,d)	N/A	10	14

No. 12 Pelletizer Hood Exhaust Stack

Particulate (GR/DSCF)	0.01	0.009	0.009
Sulfur Dioxide (ppm,d)	N/A	3	3
Oxides of Nitrogen . . . (ppm,d)	N/A	6	5

SOURCE NO. 104 (REMOVAL BASED ON LB/HR)

PM Removal Efficiency (%)	N/A	91	93
SO ₂ Removal Efficiency . . . (%)	N/A	100	100
NO _x Removal Efficiency . . . (%)	N/A	84	90

No. 12 Pelletizer Waste Gas Inlet (5-25-94)

Particulate (GR/DSCF)	N/A	0.105	0.135
Sulfur Dioxide (ppm,d)	N/A	6	6
Oxides of Nitrogen . . . (ppm,d)	N/A	107	109

No. 12 Pelletizer Waste Gas Stack (5-25-94)

Particulate (GR/DSCF)	0.01	0.033	0.038
Sulfur Dioxide (ppm,d)	N/A	≤ 1	< 1
Oxides of Nitrogen . . . (ppm,d)	N/A	107	104

<u>Source</u>	<u>LIMIT</u>	<u>MEASURED</u>

No. 1104 Pelletizer Waste Gas Stack

Particulate (GR/DSCF)	0.01	0.0386
. (LB/HR)	N/A	22

No. 1105 Pelletizer Waste Gas Stack

Particulate (GR/DSCF)	0.01	0.016
. (LB/HR)	N/A	9.7

No difficulties were encountered in the field or in the laboratory evaluation of the samples. On the basis of these facts and a complete review of the data and results, it is our opinion that the results reported herein are accurate and closely reflect the actual values which existed at the time the test was performed.

Table 1. Summary of the Results of the May 24, 1994 Particulate Emission Compliance Test on the No. 12 Pelletizer Hood Exhaust Inlet at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

** ELECTRICS ON **

ITEM	Run 1	Run 2	Run 3
Date of test	05-24-94	05-24-94	05-24-94
Time runs were done (HRS)	955/1106	1145/1247	1325/1453
Volumetric flow actual (ACFM) standard (DSCFM)	330763 235033	336829 237667	330772 234018
Gas temperature (DEG-F)	208	204	206
Moisture content (%V/V)	8.24	9.38	8.90
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	0.07 20.58 79.35	0.14 20.06 79.80	0.32 20.06 79.62
Isokinetic variation (%)	96.0	102.6	98.8
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	0.157 0.221	.0655 .0929	.0767 0.108
Part. emission rate (LB/HR)	445.3	189.2	217.5

Note: Dry Catch Only

Table 2a. Summary of the Results of the May 24, 1994 Particulate Emission Compliance Test on the No. 12 Pelletizer Hood Exhaust Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

** ELECTRICS ON **

ITEM	Run 1	Run 2	Run 3
Date of test	05-24-94	05-24-94	05-24-94
Time runs were done (HRS)	955/1059	1145/1250	1325/1453
Volumetric flow actual (ACFM)	79852	79112	79845
standard (DSCFM)	62062	61536	61812
Gas temperature (DEG-F)	132	127	129
Moisture content (%V/V)	10.64	11.20	11.35
Gas composition (%V/V, dry)			
carbon dioxide	0.30	0.30	0.30
oxygen	20.20	20.20	20.20
nitrogen	79.50	79.50	79.50
Isokinetic variation (%)	95.0	100.1	99.7
Particulate concentration			
actual (GR/ACF)	.00565	.00766	.00808
standard (GR/DSCF)	.00727	.00986	.0104
Part. emission rate (LB/HR)	3.87	5.20	5.53

Note: Dry + Organic Wet Catch

Table 2b. Summary of the Results of the May 24, 1994 Particulate Emission Compliance Test on the No. 12 Pelletizer Hood Exhaust Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

** ELECTRICS ON **

ITEM	Run 1	Run 2	Run 3
Date of test	05-24-94	05-24-94	05-24-94
Time runs were done (HRS)	955/1059	1145/1250	1325/1453
Volumetric flow actual (ACFM) standard (DSCFM)	79852 62062	79112 61536	79845 61812
Gas temperature (DEG-F)	132	127	129
Molsture content (%V/V)	10.64	11.20	11.35
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	0.30 20.20 79.50	0.30 20.20 79.50	0.30 20.20 79.50
Isokinetic variation (%)	95.0	100.1	99.7
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.00524 .00675	.00727 .00936	.00785 .0101
Part. emission rate (LB/HR)	3.59	4.93	5.38

Note: Dry Catch Only

Table 3. Summary of the Results of the May 24, 1994 Particulate Emission Compliance Test on the No. 12 Pelletizer North Rotoclone Inlet at the Cyprus Northshore Mining Plant in Silver Bay, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	05-24-94	05-24-94	05-24-94
Time runs were done (HRS)	830/ 934	1015/1120	1215/1318
Volumetric flow actual (ACFM) standard (DSCFM)	66260 41326	61295 37260	62257 37927
Gas temperature (DEG-F)	347	370	366
Moisture content (%V/V)	1.66	1.41	1.63
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	0.03 20.90 79.07	0.03 20.90 79.07	0.03 20.90 79.07
Isokinetic variation (%)	96.7	99.0	99.3
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	0.320 0.513	0.319 0.524	0.462 0.758
Part. emission rate (LB/HR)	181.8	167.4	246.5

Note: Dry Catch Only

Table 4a. Summary of the Results of the May 24, 1994 Particulate Emission Compliance Test on the No. 12 Pelletizer North Rotoclone Stack at the Cyprus Northshore Mining Plant in Silver Bay, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	05-24-94	05-24-94	05-24-94
Time runs were done (HRS)	830/ 932	1015/1116	1215/1315
Volumetric flow actual (ACFM) standard (DSCFM)	55558 54288	46506 45340	49091 48017
Gas temperature (DEG-F)	57	58	57
Moisture content (%V/V)	1.62	1.67	1.59
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	0.03 20.90 79.07	0.03 20.90 79.07	0.03 20.90 79.07
Isokinetic variation (%)	99.7	99.4	99.2
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	0.115 0.118	.00700 .00719	.0175 .0179
Part. emission rate (LB/HR)	54.82	2.79	7.39

Note: Dry + Organic Wet Catch

Table 4b. Summary of the Results of the May 24, 1994 Particulate Emission Compliance Test on the No. 12 Pelletizer North Rotoclone Stack at the Cyprus Northshore Mining Plant in Silver Bay, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	05-24-94	05-24-94	05-24-94
Time runs were done (HRS)	830/ 932	1015/1116	1215/1315
Volumetric flow actual (ACFM)	55558	46506	49091
standard (DSCFM)	54288	45340	48017
Gas temperature (DEG-F)	57	58	57
Moisture content (%V/V)	1.62	1.67	1.59
Gas composition (%V/V, dry)			
carbon dioxide	0.03	0.03	0.03
oxygen	20.90	20.90	20.90
nitrogen	79.07	79.07	79.07
Isokinetic variation (%)	99.7	99.4	99.2
Particulate concentration			
actual (GR/ACF)	0.114	.00680	.0167
standard (GR/DSCF)	0.117	.00698	.0171
Part. emission rate (LB/HR)	54.54	2.71	7.05

Note: Dry Catch Only

Table 5a. Summary of the Results of the May 24, 1994 Particulate Emission Compliance Test on the No. 12 Pelletizer Hood Exhaust Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.
 ** ELECTRICS OFF **

ITEM	Run 1	Run 2	Run 3
Date of test	05-24-94	05-24-94	05-24-94
Time runs were done (HRS)	1520/1623	1640/1743	1805/1907
Volumetric flow actual (ACFM) standard (DSCFM)	78842 63577	79401 62321	80010 61825
Gas temperature (DEG-F)	114	123	126
Moisture content (%V/V)	10.01	11.07	12.04
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	0.30 20.30 79.40	0.30 20.30 79.40	0.30 20.30 79.40
Isokinetic variation (%)	99.6	101.0	100.6
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.00783 .00971	.00670 .00853	.00781 .0101
Part. emission rate (LB/HR)	5.29	4.56	5.36

Note: Dry + Organic Wet Catch

Table 5b. Summary of the Results of the May 24, 1994 Particulate Emission Compliance Test on the No. 12 Pelletizer Hood Exhaust Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

** ELECTRICS OFF **

ITEM	Run 1	Run 2	Run 3
Date of test	05-24-94	05-24-94	05-24-94
Time runs were done (HRS)	1520/1623	1640/1743	1805/1907
Volumetric flow actual (ACFM)	78842	79401	80010
standard (DSCFM)	63577	62321	61825
Gas temperature (DEG-F)	114	123	126
Moisture content (%V/V)	10.01	11.07	12.04
Gas composition (%V/V, dry)			
carbon dioxide	0.30	0.30	0.30
oxygen	20.30	20.30	20.30
nitrogen	79.40	79.40	79.40
Isokinetic variation (%)	99.6	101.0	100.6
Particulate concentration			
actual (GR/ACF)	.00757	.00629	.00720
standard (GR/DSCF)	.00939	.00801	.00932
Part. emission rate (LB/HR)	5.11	4.28	4.94

Note: Dry Catch Only

Table 6. Summary of the Results of the May 24, 1994 Particulate Emission Compliance Test on the No. 12 Pelletizer Hood Exhaust Inlet at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

** ELECTRICS OFF **

ITEM	Run 1	Run 2	Run 3
Date of test	05-24-94	05-24-94	05-24-94
Time runs were done (HRS)	1520/1622	1640/1742	1805/1907
Volumetric flow actual (ACFM) standard (DSCFM)	328053 229235	319964 227040	326294 227251
Gas temperature (DEG-F)	204	204	205
Moisture content (%V/V)	10.29	8.89	10.46
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	0.09 20.03 79.88	0.37 20.07 79.56	0.23 20.03 79.74
Isokinetic variation (%)	101.0	98.5	101.0
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.0764 0.109	0.134 0.189	.0692 .0994
Part. emission rate (LB/HR)	214.9	367.3	193.6

Note: Dry Catch Only

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Table 7. Summary of the Results of the May 25, 1994 Particulate Emission Compliance Test on the No. 12 Pelletizer Waste Gas Inlet at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

** ELECTRICS ON **

ITEM	Run 1	Run 2	Run 3
Date of test	05-25-94	05-25-94	05-25-94
Time runs were done (HRS)	925/1031	1110/1216	1255/1401
Volumetric flow actual (ACFM) standard (DSCFM)	507828 240245	491835 233917	452084 213505
Gas temperature (DEG-F)	557	557	562
Moisture content (%V/V)	6.00	5.53	5.78
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	2.10 16.70 81.20	2.09 16.69 81.22	2.23 16.81 80.96
Isokinetic variation (%)	94.0	98.7	99.8
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.0644 0.136	.0502 0.106	.0341 .0723
Part. emission rate (LB/HR)	280.4	211.5	132.3

Note: Dry Catch Only

Table 8. Summary of the Results on the May 25, 1994 Particulate Emission Compliance Test on the No. 12 Pelletizer Waste Gas Inlet at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

** ELECTRICS OFF **

ITEM	Run 1	Run 2	Run 3
Date of test	05-25-94	05-25-94	05-25-94
Time runs were done (HRS)	1430/1536	1557/1703	1723/1828
Volumetric flow actual (ACFM) standard (DSCFM)	484604 226198	487758 227633	506075 237012
Gas temperature (DEG-F)	556	553	551
Moisture content (%V/V)	7.36	7.71	7.53
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	2.17 16.63 81.20	2.22 16.62 81.16	2.16 16.61 81.23
Isokinetic variation (%)	101.5	99.5	99.2
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.0776 0.166	.0443 .0949	.0674 0.144
Part. emission rate (LB/HR)	322.6	185.2	292.7

Note: Dry Catch Only

Table 9a. Summary of the Results of the May 25, 1994 Particulate Emission Compliance Test on the No. 12 Pelletizer Waste Gas Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

** ELECTRICS ON **

ITEM	Run 1	Run 2	Run 3
Date of test	05-25-94	05-25-94	05-25-94
Time runs were done (HRS)	925/1027	1110/1212	1255/1357
Volumetric flow actual (ACFM) standard (DSCFM)	89859 64551	89155 62729	90231 62059
Gas temperature (DEG-F)	132	138	140
Moisture content (%V/V)	16.59	17.46	19.09
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	2.47 16.74 80.79	1.87 16.77 81.36	2.01 16.65 81.34
Isokinetic variation (%)	103.7	99.0	99.5
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.0286 .0398	.0228 .0323	.0189 .0275
Part. emission rate (LB/HR)	22.04	17.39	14.64

Note: Dry + Organic Wet Catch

Table 9b. Summary of the Results of the May 25, 1994 Particulate Emission Compliance Test on the No. 12 Pelletizer Waste Gas Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

** ELECTRICS ON **

ITEM	Run 1	Run 2	Run 3
Date of test	05-25-94	05-25-94	05-25-94
Time runs were done (HRS)	925/1027	1110/1212	1255/1357
Volumetric flow actual (ACFM) standard (DSCFM)	89859 64551	89155 62729	90231 62059
Gas temperature (DEG-F)	132	138	140
Moisture content (%V/V)	16.59	17.46	19.09
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	2.47 16.74 80.79	1.87 16.77 81.36	2.01 16.65 81.34
Isokinetic variation (%)	103.7	99.0	99.5
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.0273 .0380	.0217 .0308	.0184 .0267
Part. emission rate (LB/HR)	21.02	16.56	14.20

Note: Dry Catch Only

Table 10a. Summary of the Results of the May 25, 1994 Particulate Emission Compliance Test on the No. 12 Pelletizer Waste Gas Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.
 ** ELECTRICS OFF **

ITEM	Run 1	Run 2	Run 3
Date of test	05-25-94	05-25-94	05-25-94
Time runs were done (HRS)	1430/1532	1557/1700	1723/1825
Volumetric flow actual (ACFM) standard (DSCFM)	89721 61671	89524 61752	89040 61258
Gas temperature (DEG-F)	139	138	138
Moisture content (%V/V)	19.31	19.17	19.34
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	1.90 16.68 81.42	1.90 16.69 81.41	1.90 16.71 81.39
Isokinetic variation (%)	99.7	99.3	99.7
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.0251 .0366	.0316 .0458	.0212 .0309
Part. emission rate (LB/HR)	19.33	24.23	16.22

Note: Dry + Organic Wet Catch

Table 10b. Summary of the Results of the May 25, 1994 Particulate Emission Compliance Test on the No. 12 Pelletizer Waste Gas Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

** ELECTRICS OFF **

ITEM	Run 1	Run 2	Run 3
Date of test	05-25-94	05-25-94	05-25-94
Time runs were done (HRS)	1430/1532	1557/1700	1723/1825
Volumetric flow actual (ACFM)	89721	89524	89040
standard (DSCFM)	61671	61752	61258
Gas temperature (DEG-F)	139	138	138
Moisture content (%V/V)	19.31	19.17	19.34
Gas composition (%V/V, dry)			
carbon dioxide	1.90	1.90	1.90
oxygen	16.68	16.69	16.71
nitrogen	81.42	81.41	81.39
Isokinetic variation (%)	99.7	99.3	99.7
Particulate concentration			
actual (GR/ACF)	.0246	.0313	.0203
standard (GR/DSCF)	.0358	.0454	.0296
Part. emission rate (LB/HR)	18.93	24.01	15.52

Note: Dry Catch Only

Table 11a. Summary of the Results of the May 26, 1994 Particulate Emission Compliance Test on the No. 1104 Pelletizer Waste Gas Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

** ELECTRICS ON **

ITEM	Run 1	Run 2	Run 3
Date of test	05-26-94	05-26-94	05-26-94
Time runs were done (HRS)	810/ 912	955/1057	1140/1242
Volumetric flow actual (ACFM) standard (DSCFM)	94255 69427	91314 66236	93630 68343
Gas temperature (DEG-F)	141	146	144
Moisture content (%V/V)	14.82	15.37	15.16
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	1.54 17.39 81.07	1.65 17.12 81.23	1.67 17.19 81.14
Isokinetic variation (%)	98.7	100.2	99.2
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.0179 .0243	.0596 .0822	.00678 .00930
Part. emission rate (LB/HR)	14.47	46.67	5.45

Note: Dry + Organic Wet Catch

Table 11b. Summary of the Results of the May 26, 1994 Particulate Emission Compliance Test on the No. 1104 Pelletizer Waste Gas Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.
 ** ELECTRICS ON **

ITEM	Run 1	Run 2	Run 3
Date of test	05-26-94	05-26-94	05-26-94
Time runs were done (HRS)	810/ 912	955/1057	1140/1242
Volumetric flow actual (ACFM) standard (DSCFM)	94255 69427	91314 66236	93630 68343
Gas temperature (DEG-F)	141	146	144
Moisture content (%V/V)	14.82	15.37	15.16
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	1.54 17.39 81.07	1.65 17.12 81.23	1.67 17.19 81.14
Isokinetic variation (%)	98.7	100.2	99.2
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.0173 .0235	.0594 .0819	.00644 .00883
Part. emission rate (LB/HR)	13.99	46.51	5.17

Note: Dry Catch Only

Table 12a. Summary of the Results of the May 26, 1994 Particulate Emission Compliance Test on the No. 1105 Pelletizer Waste Gas Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

** ELECTRICS ON **

ITEM	Run 1	Run 2	Run 3
Date of test	05-26-94	05-26-94	05-26-94
Time runs were done (HRS)	810/ 912	955/1057	1140/1241
Volumetric flow actual (ACFM) standard (DSCFM)	98118 73739	97737 73133	98333 71070
Gas temperature (DEG-F)	146	150	156
Moisture content (%V/V)	12.39	12.14	14.38
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	1.68 17.43 80.89	1.82 17.11 81.07	1.87 17.09 81.04
Isokinetic variation (%)	95.2	98.8	100.9
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.00706 .00940	.00561 .00750	.0219 .0302
Part. emission rate (LB/HR)	5.94	4.70	18.43

Note: Dry + Organic Wet Catch

Table 12b. Summary of the Results of the May 26, 1994 Particulate Emission Compliance Test on the No. 1105 Pelletizer Waste Gas Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

** ELECTRICS ON **

ITEM	Run 1	Run 2	Run 3
Date of test	05-26-94	05-26-94	05-26-94
Time runs were done (HRS)	810/ 912	955/1057	1140/1241
Volumetric flow actual (ACFM) standard (DSCFM)	98118 73739	97737 73133	98333 71070
Gas temperature (DEG-F)	146	150	156
Moisture content (%V/V)	12.39	12.14	14.38
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	1.68 17.43 80.89	1.82 17.11 81.07	1.87 17.09 81.04
Isokinetic variation (%)	95.2	98.8	100.9
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.00675 .00898	.00498 .00665	.0217 .0301
Part. emission rate (LB/HR)	5.68	4.17	18.32

Note: Dry Catch Only

Table 13a. Summary of the Results of the May 26, 1994 Particulate Emission Compliance Test on the Dry Cobber Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	05-26-94	05-26-94	05-26-94
Time runs were done (HRS)	1000/1101	1115/1216	1225/1326
Volumetric flow actual (ACFM) standard (DSCFM)	69262 66910	68907 66670	69455 67430
Gas temperature (DEG-F)	65	65	64
Moisture content (%V/V)	2.15	2.11	2.01
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	0.03 20.90 79.07	0.03 20.90 79.07	0.03 20.90 79.07
Isokinetic variation (%)	100.8	100.0	100.0
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.00388 .00401	.00344 .00355	.00406 .00418
Part. emission rate (LB/HR)	2.30	2.03	2.42

Note: Dry + Organic Wet Catch

Table 13b. Summary of the Results of the May 26, 1994 Particulate Emission Compliance Test on the Dry Cobber Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	05-26-94	05-26-94	05-26-94
Time runs were done (HRS)	1000/1101	1115/1216	1225/1326
Volumetric flow actual (ACFM) standard (DSCFM)	69262 66910	68907 66670	69455 67430
Gas temperature (DEG-F)	65	65	64
Moisture content (%V/V)	2.15	2.11	2.01
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	0.03 20.90 79.07	0.03 20.90 79.07	0.03 20.90 79.07
Isokinetic variation (%)	100.8	100.0	100.0
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.00331 .00343	.00274 .00283	.00223 .00230
Part. emission rate (LB/HR)	1.97	1.62	1.33

Note: Dry Catch Only

Table 14a. Summary of the Results of the May 25, 1994 Particulate Emission Compliance Test on the No. 2 Fine Crusher Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	05-25-94	05-25-94	05-25-94
Time runs were done (HRS)	944/1059	1113/1214	1225/1327
Volumetric flow actual (ACFM) standard (DSCFM)	16647 15695	16679 15868	16649 15896
Gas temperature (DEG-F)	68	65	63
Moisture content (%V/V)	2.01	1.68	1.68
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	0.03 20.90 79.07	0.03 20.90 79.07	0.03 20.90 79.07
Isokinetic variation (%)	100.0	99.7	99.8
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.00453 .00481	.00183 .00192	.00218 .00229
Part. emission rate (LB/HR)	0.647	0.261	0.312

Note: Dry + Organic Wet Catch

Table 14b. Summary of the Results of the May 25, 1994 Particulate Emission Compliance Test on the No. 2 Fine Crusher Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	05-25-94	05-25-94	05-25-94
Time runs were done (HRS)	944/1059	1113/1214	1225/1327
Volumetric flow actual (ACFM) standard (DSCFM)	16647 15695	16679 15868	16649 15896
Gas temperature (DEG-F)	68	65	63
Moisture content (%V/V)	2.01	1.68	1.68
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	0.03 20.90 79.07	0.03 20.90 79.07	0.03 20.90 79.07
Isokinetic variation (%)	100.0	99.7	99.8
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.00393 .00417	.00122 .00128	.00190 .00199
Part. emission rate (LB/HR)	0.560	0.174	0.272

Note: Dry Catch Only

Table 15a. Summary of the Results of the May 25, 1994 Particulate Emission Compliance Test on the Bin Storage Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	05-25-94	05-25-94	05-25-94
Time runs were done (HRS)	945/1048	1100/1202	1215/1316
Volumetric flow actual (ACFM)	31412	31658	31730
standard (DSCFM)	29637	29634	29925
Gas temperature (DEG-F)	72	74	73
Moisture content (%V/V)	1.55	1.89	1.31
Gas composition (%V/V, dry)			
carbon dioxide	0.03	0.03	0.03
oxygen	20.90	20.90	20.90
nitrogen	79.07	79.07	79.07
Isokinetic variation (%)	100.1	100.3	99.4
Particulate concentration			
actual (GR/ACF)	.00455	.00325	.00494
standard (GR/DSCF)	.00482	.00347	.00524
Part. emission rate (LB/HR)	1.23	0.883	1.35

Note: Dry + Organic Wet Catch

Table 15b. Summary of the Results of the May 25, 1994 Particulate Emission Compliance Test on the Bin Storage Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	05-25-94	05-25-94	05-25-94
Time runs were done (HRS)	945/1048	1100/1202	1215/1316
Volumetric flow actual (ACFM)	31412	31658	31730
standard (DSCFM)	29637	29634	29925
Gas temperature (DEG-F)	72	74	73
Moisture content (%V/V)	1.55	1.89	1.31
Gas composition (%V/V, dry)			
carbon dioxide	0.03	0.03	0.03
oxygen	20.90	20.90	20.90
nitrogen	79.07	79.07	79.07
Isokinetic variation (%)	100.1	100.3	99.4
Particulate concentration			
actual (GR/ACF)	.00369	.00214	.00427
standard (GR/DSCF)	.00391	.00229	.00453
Part. emission rate (LB/HR)	0.994	0.582	1.16

Note: Dry Catch Only

Table 16a. Summary of the Results of the May 27, 1994 Particulate Emission Compliance Test on the No. 2 Boiler Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	05-27-94	05-27-94	05-27-94
Time runs were done (HRS)	803/ 908	932/1044	1115/1218
Volumetric flow actual (ACFM) standard (DSCFM)	247542 157735	246662 155547	249645 156275
Gas temperature (DEG-F)	280	286	285
Moisture content (%V/V)	8.95	9.07	9.87
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	13.14 8.72 78.14	10.76 9.00 80.24	10.83 8.61 80.56
Isokinetic variation (%)	101.6	99.5	100.3
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.0120 .0188	.00701 .0111	.0126 .0201
Part. emission rate (LB/HR)	25.41	14.82	26.92
Emission factor (LB/MMBTU)	0.045	0.027	0.048

Note: Dry + Organic Wet Catch

Table 16b. Summary of the Results of the May 27, 1994 Particulate Emission Compliance Test on the No. 2 Boiler Stack at the Cyprus Northshore Mining Plant Located in Silver Bay, Minnesota.

ITEM	Run 1	Run 2	Run 3
Date of test	05-27-94	05-27-94	05-27-94
Time runs were done (HRS)	803/ 908	932/1044	1115/1218
Volumetric flow actual (ACFM) standard (DSCFM)	247542 157735	246662 155547	249645 156275
Gas temperature (DEG-F)	280	286	285
Moisture content (%V/V)	8.95	9.07	9.87
Gas composition (%V/V, dry) carbon dioxide oxygen nitrogen	13.14 8.72 78.14	10.76 9.00 80.24	10.83 8.61 80.56
Isokinetic variation (%)	101.6	99.5	100.3
Particulate concentration actual (GR/ACF) standard (GR/DSCF)	.0115 .0181	.00624 .00989	.0122 .0195
Part. emission rate (LB/HR)	24.46	13.19	26.13

Note: Dry Catch Only

Table 17a. Summary of the Results of the May 27, 1994 **Sulfur Dioxide** Emission Compliance Test of the No. 2 Boiler Stack at the Cyprus Northshore Mining Facility in Silver Bay, Minnesota.

Test/Run	Date	Time (HRS)	Concentration (ppm,d)	Emission Factor (LB/10 ⁶ BTU)
23/1	5-27-94	0843-0941	204	0.608
23/2	5-27-94	1003-1101	207	0.617
23/3	5-27-94	1118-1216	209	0.623
Avg			207	0.616

Table 17b. Summary of the Results of the May 24 - 27, 1994 Sulfur Dioxide Emission Compliance Tests at the Cyprus Northshore Mining Facility in Silver Bay, Minnesota.

Test/Run	Date	Time (HRS)	Concentration (ppm,d)	Emission Rate (LB/HR)
No. 12 Pelletizer Hood Exhaust Inlet - (ELECTRICS ON)				
1/1	5-24-94	0953-1051	4	9.4
1/2	5-24-94	1148-1246	12	28
1/3	5-24-94	1328-1452	12	28
Avg			9	22
No. 12 Pelletizer Hood Exhaust Inlet - (ELECTRICS OFF)				
7/1	5-24-94	1523-1621	14	32
7/2	5-24-94	1643-1741	14	32
7/3	5-24-94	1808-1906	14	32
Avg			14	32
No. 12 Pelletizer Hood Exhaust Stack - (ELECTRICS ON)				
2/1	5-24-94	0954-1052	4	2.5
2/2	5-24-94	1149-1247	4	2.5
2/3	5-24-94	1329-1453	2	1.2
Avg			3	2.1
No. 12 Pelletizer Hood Exhaust Stack - (ELECTRICS OFF)				
6/1	5-24-94	1524-1622	1	0.63
6/2	5-24-94	1644-1742	3	1.9
6/3	5-24-94	1809-1907	4	2.5
Avg			3	1.7

Table 17c. Summary of the Results of the May 24 - 27, 1994 Sulfur Dioxide Emission Compliance Tests at the Cyprus Northshore Mining Facility in Silver Bay, Minnesota.

Test/Run	Date	Time (HRS)	Concentration (ppm,d)	Emission Rate (LB/HR)
No. 12 Pelletizer Waste Gas Inlet - (ELECTRICS ON)				
8/1	5-25-94	0928-1026	6	14
8/2	5-25-94	1113-1211	6	14
8/3	5-25-94	1258-1356	6	13
Avg			6	14
No. 12 Pelletizer Waste Gas Inlet - (ELECTRICS OFF)				
9/1	5-25-94	1433-1531	7	16
9/2	5-25-94	1600-1658	7	16
9/3	5-25-94	1726-1824	3	7.1
Avg			6	13
No. 12 Pelletizer Waste Gas Stack - (ELECTRICS ON)				
10/1	5-25-94	0929-1027	2	1.3
10/2	5-25-94	1114-1212	< 1	< 0.63
10/3	5-25-94	1259-1357	< 1	< 0.62
Avg			≤ 1	≤ 0.84
No. 12 Pelletizer Waste Gas Stack - (ELECTRICS OFF)				
12/1	5-25-94	1434-1532	< 1	< 0.62
12/2	5-25-94	1600-1658	< 1	< 0.62
12/3	5-25-94	1727-1825	< 1	< 0.62
Avg			< 1	< 0.62

Table 17d. Summary of the Results of the May 24 - 27, 1994 Sulfur Dioxide Emission Compliance Tests at the Cyprus Northshore Mining Facility in Silver Bay, Minnesota.

Test/Run	Date	Time (HRS)	Concentration (ppm,d)	Emission Rate (LB/HR)
No. 1104 Pelletizer Waste Gas Stack - (ELECTRICS ON)				
15/1	5-26-94	0814-0913	< 1	< 0.69
15/2	5-26-94	0959-1058	< 1	< 0.66
15/3	5-26-94	1144-1242	3.1	2.1
Avg				≤ 1.2
No. 1105 Pelletizer Waste Gas Stack - (ELECTRICS ON)				
16/1	5-26-94	0811-0912	4	2.9
16/2	5-26-94	0956-1057	4	2.9
16/3	5-26-94	1141-1241	2	1.4
Avg			3	2.4

Table 18a. Summary of the Results of the May 27, 1994 **Oxides of Nitrogen** Emission Compliance Test of the **No. 2 Boiler Stack** at the Cyprus Northshore Mining Facility in Silver Bay, Minnesota.

<u>Test/Run</u>	<u>Date</u>	<u>Time (HRS)</u>	<u>Concentration (ppm,d)</u>	<u>Emission Factor (LB/10⁶BTU)</u>
23/1	5-27-94	0843-0941	344	0.737
23/2	5-27-94	1003-1101	309	0.662
23/3	5-27-94	1118-1216	327	0.700
Avg			327	0.700

Table 18b. Summary of the Results of the May 24 - 27, 1994 Oxides of Nitrogen Emission Compliance Tests at the Cyprus Northshore Mining Facility in Silver Bay, Minnesota.

Test/Run	Date	Time (HRS)	Concentration (ppm,d)	Emission Rate (LB/HR)
No. 12 Pelletizer Hood Exhaust Inlet - (ELECTRICS ON)				
1/1	5-24-94	0953-1051	1	1.7
1/2	5-24-94	1148-1246	14	24
1/3	5-24-94	1328-1452	14	23
Avg			10	16
No. 12 Pelletizer Hood Exhaust Inlet - (ELECTRICS OFF)				
7/1	5-24-94	1523-1621	15	25
7/2	5-24-94	1643-1741	14	23
7/3	5-24-94	1808-1906	14	23
Avg			14	23
No. 12 Pelletizer Hood Exhaust Stack - (ELECTRICS ON)				
2/1	5-24-94	0954-1052	6	2.7
2/2	5-24-94	1149-1247	6	2.6
2/3	5-24-94	1329-1453	5	2.2
Avg			6	2.5
No. 12 Pelletizer Hood Exhaust Stack - (ELECTRICS OFF)				
6/1	5-24-94	1524-1622	5	2.3
6/2	5-24-94	1644-1742	5	2.2
6/3	5-24-94	1809-1907	6	2.7
Avg			5	2.4

Table 18c. Summary of the Results of the May 24 - 27, 1994 Oxides of Nitrogen Emission Compliance Tests at the Cyprus Northshore Mining Facility in Silver Bay, Minnesota.

Test/Run	Date	Time (HRS)	Concentration (ppm,d)	Emission Rate (LB/HR)
No. 12 Pelletizer Waste Gas Inlet - (ELECTRICS ON)				
8/1	5-25-94	0928-1026	104	179
8/2	5-25-94	1113-1211	108	181
8/3	5-25-94	1258-1356	110	168
Avg			107	176
No. 12 Pelletizer Waste Gas Inlet - (ELECTRICS OFF)				
9/1	5-25-94	1433-1531	110	178
9/2	5-25-94	1600-1658	109	178
9/3	5-25-94	1726-1824	107	182
Avg			109	179
No. 12 Pelletizer Waste Gas Stack - (ELECTRICS ON)				
10/1	5-25-94	0929-1027	108	50
10/2	5-25-94	1114-1212	108	50
10/3	5-25-94	1259-1357	105	47
Avg			107	48
No. 12 Pelletizer Waste Gas Stack - (ELECTRICS OFF)				
12/1	5-25-94	1434-1532	105	46
12/2	5-25-94	1600-1658	104	46
12/3	5-25-94	1727-1825	103	45
Avg			104	46

Table 18d. Summary of the Results of the May 24 - 27, 1994 Oxides of Nitrogen Emission Compliance Tests at the Cyprus Northshore Mining Facility in Silver Bay, Minnesota.

Test/Run	Date	Time (HRS)	Concentration (ppm,d)	Emission Rate (LB/HR)
No. 1104 Pelletizer Waste Gas Stack - (ELECTRICS ON)				
15/1	5-26-94	0814-0913	83	41
15/2	5-26-94	0959-1058	84	40
15/3	5-26-94	1144-1242	90	44
Avg			86	42
No. 1105 Pelletizer Waste Gas Stack - (ELECTRICS ON)				
16/1	5-26-94	0811-0912	77	41
16/2	5-26-94	0956-1057	86	45
16/3	5-26-94	1141-1241	87	44
Avg			83	43

3 RESULTS

The results of all field and laboratory evaluations are presented in this section. Gas composition (Orsat and moisture) are presented first followed by the computer printout of the particulate, sulfur dioxide, oxides of nitrogen, and opacity observations. Preliminary measurements including test port locations are given in the appendices.

The results have been calculated on a personal computer using programs written in Extended BASIC specifically for source testing calculations. EPA-published equations have been used as the basis of the calculation techniques in these programs. The particulate emission rate has been calculated using the product of the concentration times flow method.

3.1 Results of Orsat & Moisture Analysis

Test No. 1
No. 12 Pelletizer Hood Exhaust Inlet

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

Date of run	Run 1 05-24-94	Run 2 05-24-94	Run 3 05-24-94

Dry basis (orsat)

carbon dioxide.....	0.07	0.14	0.32
oxygen.....	20.58	20.06	20.06
nitrogen.....	79.35	79.80	79.62

Wet basis (orsat)

carbon dioxide.....	0.06	0.13	0.29
oxygen.....	18.88	18.18	18.27
nitrogen.....	72.81	72.31	72.53
water vapor.....	8.24	9.38	8.90

Dry molecular weight.....	28.83	28.82	28.85
Wet molecular weight.....	27.94	27.81	27.89
Specific gravity.....	0.965	0.961	0.963
Water mass flow.....(LB/HR)	59248	69094	64245

FO.	4.571	6.000	2.625

Test No. 2
No. 12 Pelletizer Hood Exhaust Stack

Results of Orsat & Moisture Analyses-----Methods 3 & 4(lv/v)

Date of run	Run 1 05-24-94	Run 2 05-24-94	Run 3 05-24-94
Dry basis (orsat)			
carbon dioxide.....	0.30	0.30	0.30
oxygen.....	20.20	20.20	20.20
nitrogen.....	79.50	79.50	79.50
Wet basis (orsat)			
carbon dioxide.....	0.27	0.27	0.27
oxygen.....	18.05	17.94	17.91
nitrogen.....	71.04	70.59	70.47
water vapor.....	10.64	11.20	11.35
Dry molecular weight.....	28.86	28.86	28.86
Wet molecular weight.....	27.70	27.64	27.62
Specific gravity.....	0.957	0.955	0.954
Water mass flow.....(LB/HR)	20723	21777	22207
FO	2.333	2.333	2.333

Test No. 4
No. 12 Pelletizer North Rotoclone Inlet

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

Date of run	Run 1 05-24-94	Run 2 05-24-94	Run 3 05-24-94
Dry basis (orsat)			
carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.90	20.90	20.90
nitrogen.....	79.07	79.07	79.07
Wet basis (orsat)			
carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.55	20.60	20.56
nitrogen.....	77.76	77.95	77.78
water vapor.....	1.66	1.41	1.63
Dry molecular weight.....	28.84	28.84	28.84
Wet molecular weight.....	28.66	28.69	28.66
Specific gravity.....	0.990	0.991	0.990
Water mass flow.....(LB/HR)	1954	1500	1768

Test No. 5
No. 12 Pelletizer North Rotoclone Stack

Results of Orsat & Moisture Analyses-----Methods 3 & 4(t/v/v)

Date of run	Run 1 05-24-94	Run 2 05-24-94	Run 3 05-24-94
Dry basis (orsat)			
carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.90	20.90	20.90
nitrogen.....	79.07	79.07	79.07
Wet basis (orsat)			
carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.56	20.55	20.57
nitrogen.....	77.79	77.75	77.81
water vapor.....	1.62*	1.67*	1.59*
Dry molecular weight.....	28.84	28.84	28.84
Wet molecular weight.....	28.67	28.66	28.67
Specific gravity.....	0.990	0.990	0.990
Water mass flow.....(LB/HR)	13387	10609	9148

* Free or condensed water in the gas stream.

Test No. 6
No. 12 Pelletizer Hood Exhaust Stack

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

Date of run	Run 1 05-24-94	Run 2 05-24-94	Run 3 05-24-94

Dry basis (orsat)

carbon dioxide.....	0.30	0.30	0.30
oxygen.....	20.30	20.30	20.30
nitrogen.....	79.40	79.40	79.40

Wet basis (orsat)

carbon dioxide.....	0.27	0.27	0.26
oxygen.....	18.27	18.05	17.86
nitrogen.....	71.45	70.61	69.84
water vapor.....	10.01*	11.07	12.04

Dry molecular weight.....	28.86	28.86	28.86
Wet molecular weight.....	27.77	27.66	27.55
Specific gravity.....	0.959	0.955	0.952
Water mass flow.....(LB/HR)	22046	21750	23746

* Free or condensed water in the gas stream.

FO	2.000	2.000	2.000

Test No. 7
No. 12 Pelletizer Hood Exhaust Inlet

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

Date of run	Run 1 05-24-94	Run 2 05-24-94	Run 3 05-24-94

Dry basis (orsat)

carbon dioxide.....	0.09	0.37	0.23
oxygen.....	20.03	20.07	20.03
nitrogen.....	79.88	79.56	79.74

Wet basis (orsat)

carbon dioxide.....	0.08	0.34	0.21
oxygen.....	17.97	18.29	17.94
nitrogen.....	71.66	72.49	71.40
water vapor.....	10.29	8.89	10.46

Dry molecular weight.....	28.82	28.86	28.84
Wet molecular weight.....	27.70	27.90	27.70
Specific gravity.....	0.957	0.964	0.957
Water mass flow.....(LB/HR)	73855	62192	74555

FO	9.667	2.243	3.783

Test No. 8
No. 12 Pelletizer Waste Gas Inlet

Results of Orsat & Moisture Analyses-----Methods 3 & 4(t/v/v)

Date of run	Run 1 05-25-94	Run 2 05-25-94	Run 3 05-25-94

Dry basis (orsat)

carbon dioxide.....	2.10	2.09	2.23
oxygen.....	16.70	16.69	16.81
nitrogen.....	81.20	81.22	80.96

Wet basis (orsat)

carbon dioxide.....	1.97	1.97	2.10
oxygen.....	15.70	15.77	15.84
nitrogen.....	76.32	76.73	76.28
water vapor.....	6.00	5.53	5.78

Dry molecular weight.....	29.00	29.00	29.03
Wet molecular weight.....	28.34	28.39	28.39
Specific gravity.....	0.979	0.981	0.981
Water mass flow.....(LB/HR)	43052	38414	36737

FO	2.000	2.014	1.834

Test No. 9
No. 12 Pelletizer Waste Gas Inlet

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

Date of run	Run 1 05-25-94	Run 2 05-25-94	Run 3 05-25-94
Dry basis (orsat)			
carbon dioxide.....	2.17	2.22	2.16
oxygen.....	16.63	16.62	16.61
nitrogen.....	81.20	81.16	81.23
Wet basis (orsat)			
carbon dioxide.....	2.01	2.05	2.00
oxygen.....	15.41	15.34	15.36
nitrogen.....	75.22	74.91	75.12
water vapor.....	7.36	7.71	7.53
Dry molecular weight.....	29.01	29.02	29.01
Wet molecular weight.....	28.20	28.17	28.18
Specific gravity.....	0.974	0.973	0.973
Water mass flow.....(LB/HR)	50464	53357	54162
FO	1.968	1.928	1.986

Test No. 10
No. 12 Pelletizer Waste Gas Stack

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

Date of run	Run 1 05-25-94	Run 2 05-25-94	Run 3 05-25-94

Dry basis (orsat)

carbon dioxide.....	2.47	1.87	2.01
oxygen.....	16.74	16.77	16.65
nitrogen.....	80.79	81.36	81.34

Wet basis (orsat)

carbon dioxide.....	2.06	1.54	1.63
oxygen.....	13.96	13.84	13.47
nitrogen.....	67.38	67.15	65.81
water vapor.....	16.59*	17.46	19.09
Dry molecular weight.....	29.06	28.97	28.99
Wet molecular weight.....	27.23	27.05	26.89
Specific gravity.....	0.941	0.935	0.929
Water mass flow.....(LB/HR)	41538	37231	41071

* Free or condensed water in the gas stream.

FO	1.684	2.209	2.114

Test No. 12
No. 12 Pelletizer Waste Gas Stack

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

Date of run	Run 1 05-25-94	Run 2 05-25-94	Run 3 05-25-94
Dry basis (orsat)			
carbon dioxide.....	1.90	1.90	1.90
oxygen.....	16.68	16.69	16.71
nitrogen.....	81.42	81.41	81.39
Wet basis (orsat)			
carbon dioxide.....	1.53	1.54	1.53
oxygen.....	13.46	13.49	13.48
nitrogen.....	65.70	65.80	65.65
water vapor.....	19.31	19.17*	19.34*
Dry molecular weight.....	28.97	28.97	28.97
Wet molecular weight.....	26.85	26.87	26.85
Specific gravity.....	0.928	0.928	0.927
Water mass flow.....(LB/HR)	41388	42626	45600

* Free or condensed water in the gas stream.

FO	2.221	2.216	2.205

Test No. 15
No. 1104 Pelletizer Waste Gas Stack

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

Date of run	Run 1 05-26-94	Run 2 05-26-94	Run 3 05-26-94
Dry basis (orsat)			
carbon dioxide.....	1.54	1.65	1.67
oxygen.....	17.39	17.12	17.19
nitrogen.....	81.07	81.23	81.14
Wet basis (orsat)			
carbon dioxide.....	1.31	1.40	1.42
oxygen.....	14.81	14.49	14.58
nitrogen.....	69.06	68.74	68.84
water vapor.....	14.82	15.37	15.16
Dry molecular weight.....	28.94	28.95	28.95
Wet molecular weight.....	27.32	27.27	27.29
Specific gravity.....	0.944	0.942	0.943
Water mass flow.....(LB/HR)	33881	33747	34247
FO	2.279	2.291	2.222

Test No. 16
No. 1105 Pelletizer Waste Gas Stack

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

Date of run	Run 1 05-26-94	Run 2 05-26-94	Run 3 05-26-94

Dry basis (orsat)

carbon dioxide.....	1.68	1.82	1.87
oxygen.....	17.43	17.11	17.09
nitrogen.....	80.89	81.07	81.04

Wet basis (orsat)

carbon dioxide.....	1.47	1.60	1.60
oxygen.....	15.27	15.03	14.63
nitrogen.....	70.87	71.22	69.38
water vapor.....	12.39	12.14	14.38

Dry molecular weight.....	28.97	28.98	28.98
Wet molecular weight.....	27.61	27.64	27.40
Specific gravity.....	0.954	0.955	0.947
Water mass flow.....(LB/HR)	29246	28357	33487

FO	2.065	2.082	2.037

Test No. 19
Dry Cobber Stack

Results of Orsat & Moisture Analyses-----Methods 3 & 4(*v/v)

Date of run	Run 1 05-26-94	Run 2 05-26-94	Run 3 05-26-94
Dry basis (orsat)			
carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.90	20.90	20.90
nitrogen.....	79.07	79.07	79.07
Wet basis (orsat)			
carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.45	20.46	20.48
nitrogen.....	77.37	77.40	77.48
water vapor.....	2.15*	2.11*	2.01*
Dry molecular weight.....	28.84	28.84	28.84
Wet molecular weight.....	28.61	28.61	28.62
Specific gravity.....	0.988	0.988	0.989
Water mass flow.....(LB/HR)	7193	7735	7497

* Free or condensed water in the gas stream.

Test No. 20
No. 2 Fine Crusher Stack

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

	Run 1	Run 2	Run 3
Date of run	05-25-94	05-25-94	05-25-94

Dry basis (orsat)

carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.90	20.90	20.90
nitrogen.....	79.07	79.07	79.07

Wet basis (orsat)

carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.48	20.55	20.55
nitrogen.....	77.48	77.74	77.74
water vapor.....	2.01	1.68	1.68

Dry molecular weight.....	28.84	28.84	28.84
Wet molecular weight.....	28.62	28.66	28.66
Specific gravity.....	0.989	0.990	0.990
Water mass flow.....(LB/HR)	904	762	761

Test No. 21
Bin Storage Stack

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

Date of run	Run 1 05-25-94	Run 2 05-25-94	Run 3 05-25-94
Dry basis (orsat)			
carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.90	20.90	20.90
nitrogen.....	79.07	79.07	79.07
Wet basis (orsat)			
carbon dioxide.....	0.03	0.03	0.03
oxygen.....	20.58	20.50	20.63
nitrogen.....	77.85	77.57	78.04
water vapor.....	1.55	1.89	1.31
Dry molecular weight.....	28.84	28.84	28.84
Wet molecular weight.....	28.67	28.64	28.70
Specific gravity.....	0.990	0.989	0.991
Water mass flow.....(LB/HR)	1305	1605	1112

Test No. 23
No. 2 Boiler Stack

Results of Orsat & Moisture Analyses-----Methods 3 & 4(%v/v)

Date of run	Run 1 05-27-94	Run 2 05-27-94	Run 3 05-27-94

Dry basis (orsat)

carbon dioxide.....	13.14	10.76	10.83
oxygen.....	8.72	9.00	8.61
nitrogen.....	78.14	80.24	80.56

Wet basis (orsat)

carbon dioxide.....	11.96	9.78	9.76
oxygen.....	7.94	8.18	7.76
nitrogen.....	71.15	72.96	72.61
water vapor.....	8.95	9.07	9.87

Dry molecular weight.....	30.45	30.08	30.08
Wet molecular weight.....	29.34	28.99	28.89
Specific gravity.....	1.013	1.001	0.998
Water mass flow.....(LB/HR)	43497	43526	47993

FO	0.927	1.106	1.135

3.2 Results of Particulate Loading Determinations

Test No. 1
No. 12 Pelletizer Hood Exhaust Inlet
(ELECTRICS ON)

Results of Particulate Loading Determinations-----Method 5

	Run 1	Run 2	Run 3
Date of run	05-24-94	05-24-94	05-24-94
Time run start/end.....(HRS)	955/1106	1145/1247	1325/1453
Static pressure.....(IN.WC)	1.55	1.55	1.55
Cross sectional area (SQ.FT)	65.92	65.92	65.92
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	52.0	70.0	66.0
impingers.....(GRAMS)	0.0	0.0	0.0
desiccant.....(GRAMS)	25.0	26.0	20.0
total.....(GRAMS)	77.0	96.0	86.0
Total particulate material..			
.....collected(grams)	0.5787	0.2629	0.2912
Gas meter coefficient.....	0.9971	0.9971	0.9971
Barometric pressure..(IN.HG)	29.18	29.18	29.18
Avg. orif.pres.drop..(IN.WC)	1.64	1.93	1.73
Avg. gas meter temp..(DEF-F)	69.8	76.6	76.0
Volume through gas meter....			
at meter conditions...(CF)	41.53	45.44	43.08
standard conditions.(DSCF)	40.40	43.67	41.43
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.190	.190	.190
Avg.stack gas temp ..(DEG-F)	208	204	206
Volumetric flow rate.....			
actual.....(ACFM)	330763	336829	330772
dry standard.....(DSCFM)	235033	237667	234018
Isokinetic variation.....(%)	96.0	102.6	98.8
Particulate concentration...			
actual.....(GR/ACF)	0.15700	0.06551	0.07670
dry standard.....(GR/DSCF)	0.22103	0.09288	0.10845
Particle mass rate...(LB/HR)	445.283	189.217	217.538

Test No. 2
No. 12 Pelletizer Hood Exhaust Stack
(ELECTRICS ON)

Results of Particulate Loading Determinations-----Method 5

	Run 1	Run 2	Run 3
Date of run	05-24-94	05-24-94	05-24-94
Time run start/end.....(HRS)	955/1059	1145/1250	1325/1453
Static pressure.....(IN.WC)	-0.38	-0.38	-0.38
Cross sectional area (SQ.FT)	26.73	26.73	26.73
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	90.0	109.0	118.0
desiccant.....(GRAMS)	22.0	15.0	8.0
total.....(GRAMS)	112.0	124.0	126.0
Total particulate material..			
.....collected(grams)	0.0209	0.0296	0.0314
Gas meter coefficient.....	0.9925	0.9925	0.9925
Barometric pressure..(IN.HG)	29.18	29.18	29.18
Avg. orif.pres.drop..(IN.WC)	1.82	2.01	2.02
Avg. gas meter temp..(DEF-F)	68.7	73.5	76.9
Volume through gas meter....			
at meter conditions...(CF)	45.70	48.15	48.50
standard conditions.(DSCF)	44.36	46.34	46.38
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.248	.248	.248
Avg.stack gas temp ..(DEG-F)	132	127	129
Volumetric flow rate.....			
actual.....(ACFM)	79852	79112	79845
dry standard.....(DSCFM)	62062	61536	61812
Isokinetic variation.....(%)	95.0	100.1	99.7
Particulate concentration...			
actual.....(GR/ACF)	0.00565	0.00766	0.00808
dry standard.....(GR/DSCF)	0.00727	0.00986	0.01045
Particle mass rate...(LB/HR)	3.867	5.198	5.534

Test No. 4
No. 12 Pelletizer North Rotoclone Inlet

Results of Particulate Loading Determinations-----Method 5

	Run 1 05-24-94	Run 2 05-24-94	Run 3 05-24-94
Date of run			
Time run start/end.....(HRS)	830/ 934	1015/1120	1215/1318
Static pressure.....(IN.WC)	-2.40	-2.40	-2.40
Cross sectional area (SQ.FT)	12.05	12.05	12.05
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	3.0	3.0	3.0
desiccant.....(GRAMS)	11.0	8.0	10.0
total.....(GRAMS)	14.0	11.0	13.0
Total particulate material..			
.....collected(grams)	1.3025	1.2277	1.8129
Gas meter coefficient.....	1.0078	1.0078	1.0078
Barometric pressure...(IN.HG)	29.18	29.18	29.18
Avg. orif.pres.drop...(IN.WC)	1.46	1.26	1.30
Avg. gas meter temp...(DEF-F)	68.0	70.2	75.5
Volume through gas meter....			
at meter conditions...(CF)	39.72	36.82	37.96
standard conditions.(DSCF)	39.17	36.14	36.89
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.190	.190	.190
Avg.stack gas temp ..(DEG-F)	347	370	366
Volumetric flow rate.....			
actual.....(ACFM)	66260	61295	62257
dry standard.....(DSCFM)	41326	37260	37927
Isokinetic variation.....(%)	96.7	99.0	99.3
Particulate concentration...			
actual.....(GR/ACF)	0.31990	0.31851	0.46173
dry standard.....(GR/DSCF)	0.51312	0.52418	0.75822
Particle mass rate...(LB/HR)	181.757	167.406	246.490

Test No. 5
No. 12 Pelletizer North Rotoclone Stack

Results of Particulate Loading Determinations-----Method 5

	Run 1 05-24-94	Run 2 05-24-94	Run 3 05-24-94
Date of run			
Time run start/end.....(HRS)	830/ 932	1015/1116	1215/1315
Static pressure.....(IN.WC)	-1.05	-1.05	-1.05
Cross sectional area (SQ.FT)	11.29	11.29	11.29
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	82.0	68.0	58.0
desiccant.....(GRAMS)	18.0	11.0	10.0
total.....(GRAMS)	100.0	79.0	68.0
Total particulate material..			
.....collected(grams)	0.4095	0.0208	0.0549
Gas meter coefficient.....	1.0047	1.0066	1.0066
Barometric pressure..(IN.HG)	29.18	29.18	29.18
Avg. orif.pres.drop..(IN.WC)	2.90	1.90	2.16
Avg. gas meter temp..(DEF-F)	88.5	79.1	85.4
Volume through gas meter....			
at meter conditions...(CF)	56.47	46.24	49.42
standard conditions.(DSCF)	53.63	44.65	47.20
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.185	.185	.185
Avg.stack gas temp ..(DEG-F)	57	58	57
Volumetric flow rate.....			
actual.....(ACFM)	55558	46506	49091
dry standard.....(DSCFM)	54288	45340	48017
Isokinetic variation.....(%)	99.7	99.4	99.2
Particulate concentration...			
actual.....(GR/ACF)	0.11508	0.00700	0.01755
dry standard.....(GR/DSCF)	0.11781	0.00719	0.01795
Particle mass rate...(LB/HR)	54.822	2.793	7.386

Test No. 6
No. 12 Pelletizer Hood Exhaust Stack
(ELECTRICS OFF)

Results of Particulate Loading Determinations-----Method 5

	Run 1	Run 2	Run 3
Date of run	05-24-94	05-24-94	05-24-94
Time run start/end.....(HRS)	1520/1623	1640/1743	1805/1907
Static pressure.....(IN.WC)	-0.38	-0.38	-0.38
Cross sectional area (SQ.FT)	26.73	26.73	26.73
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	108.0	110.0	120.0
desiccant.....(GRAMS)	17.0	15.0	16.0
total.....(GRAMS)	125.0	125.0	136.0
Total particulate material..			
.....collected(grams)	0.0300	0.0262	0.0307
Gas meter coefficient.....	0.9980	0.9980	0.9980
Barometric pressure..(IN.HG)	29.18	29.18	29.18
Avg. orif.pres.drop..(IN.WC)	2.10	2.10	2.06
Avg. gas meter temp..(DEF-F)	77.8	82.7	84.7
Volume through gas meter....			
at meter conditions...(CF)	49.65	49.78	49.40
standard conditions.(DSCF)	47.68	47.37	46.83
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.248	.248	.248
Avg.stack gas temp ..(DEG-F)	114	123	126
Volumetric flow rate.....			
actual.....(ACFM)	78842	79401	80010
dry standard.....(DSCFM)	63577	62321	61825
Isokinetic variation.....(%)	99.6	101.0	100.6
Particulate concentration...			
actual.....(GR/ACF)	0.00783	0.00670	0.00781
dry standard.....(GR/DSCF)	0.00971	0.00853	0.01012
Particle mass rate...(LB/HR)	5.291	4.559	5.360

Test No. 7
No. 12 Pelletizer Hood Exhaust Inlet

(ELECTRICS OFF)

Results of Particulate Loading Determinations-----Method 5

	Run 1 05-24-94	Run 2 05-24-94	Run 3 05-24-94
Date of run			
Time run start/end.....(HRS)	1520/1622	1640/1742	1805/1907
Static pressure.....(IN.WC)	1.55	1.55	1.55
Cross sectional area (SQ.FT)	65.92	65.92	65.92
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	76.0	62.0	79.0
impingers.....(GRAMS)	0.0	0.0	0.0
desiccant.....(GRAMS)	25.0	21.0	23.0
total.....(GRAMS)	101.0	83.0	102.0
Total particulate material..			
.....collected(grams)	0.2939	0.4902	0.2648
Gas meter coefficient.....	0.9971	0.9971	0.9971
Barometric pressure..(IN.HG)	29.18	29.18	29.18
Avg. orif.pres.drop..(IN.WC)	1.75	1.64	1.73
Avg. gas meter temp..(DEF-F)	78.0	79.1	80.8
Volume through gas meter....			
at meter conditions...(CF)	43.27	41.92	43.14
standard conditions:(DSCF)	41.46	40.07	41.12
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.190	.190	.190
Avg.stack gas temp ..(DEG-F)	204	204	205
Volumetric flow rate.....			
actual.....(ACFM)	328053	319964	326294
dry standard.....(DSCFM)	229235	227040	227251
Isokinetic variation.....(%)	101.0	98.5	101.0
Particulate concentration...			
actual.....(GR/ACF)	0.07640	0.13388	0.06918
dry standard.....(GR/DSCF)	0.10938	0.18874	0.09937
Particle mass rate...(LB/HR)	214.912	367.306	193.550

Test No. 8
No. 12 Pelletizer Waste Gas Inlet
(ELECTRICS ON)

Results of Particulate Loading Determinations-----Method 5

	Run 1 05-25-94	Run 2 05-25-94	Run 3 05-25-94
Date of run			
Time run start/end.....(HRS)	925/1031	1110/1216	1255/1401
Static pressure.....(IN.WC)	1.35	1.35	1.35
Cross sectional area (SQ.FT)	58.78	58.78	58.78
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	48.0	46.0	43.0
desiccant.....(GRAMS)	16.0	14.0	15.0
total.....(GRAMS)	64.0	60.0	58.0
Total particulate material..			
.....collected(grams)	0.4169	0.3304	0.2089
Gas meter coefficient.....	0.9971	0.9971	0.9971
Barometric pressure..(IN.HG)	28.92	28.92	28.92
Avg. orif.pres.drop..(IN.WC)	2.10	2.25	1.91
Avg. gas meter temp..(DEF-F)	73.1	79.3	82.2
Volume through gas meter....			
at meter conditions...(CF)	49.24	50.94	47.29
standard conditions.(DSCF)	47.23	48.32	44.58
Total sampling time....(MIN)	62.50	62.50	62.50
Nozzle diameter.....(IN)	.190	.190	.190
Avg.stack gas temp ..(DEG-F)	557	557	562
Volumetric flow rate.....			
actual.....(ACFM)	507828	491835	452084
dry standard.....(DSCFM)	240245	233917	213505
Isokinetic variation.....(%)	94.0	98.7	99.8
Particulate concentration...			
actual.....(GR/ACF)	0.06440	0.05016	0.03413
dry standard.....(GR/DSCF)	0.13619	0.10550	0.07230
Particle mass rate...(LB/HR)	280.444	211.533	132.317

Test No. 9
No. 12 Pelletizer Waste Gas Inlet
(ELECTRICS OFF)

Results of Particulate Loading Determinations-----Method 5

	Run 1	Run 2	Run 3
Date of run	05-25-94	05-25-94	05-25-94
Time run start/end.....(HRS)	1430/1536	1557/1703	1723/1828
Static pressure.....(IN.WC)	1.35	1.35	1.35
Cross sectional area (SQ.FT)	58.78	58.78	58.78
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	40.0	48.0	46.0
impingers.....(GRAMS)	0.0	0.0	0.0
desiccant.....(GRAMS)	41.0	36.0	39.0
total.....(GRAMS)	81.0	84.0	85.0
Total particulate material..			
.....collected(grams)	0.5178	0.2915	0.4593
Gas meter coefficient.....	0.9971	0.9971	0.9971
Barometric pressure..(IN.HG)	28.92	28.92	28.92
Avg. orif.pres.drop..(IN.WC)	2.18	2.27	2.34
Avg. gas meter temp..(DEF-F)	80.8	87.7	89.2
Volume through gas meter....			
at meter conditions...(CF)	50.77	50.74	52.80
standard conditions.(DSCF)	48.02	47.40	49.19
Total sampling time....(MIN)	62.50	62.50	62.50
Nozzle diameter.....(IN)	.190	.190	.190
Avg.stack gas temp ..(DEG-F)	556	553	551
Volumetric flow rate.....			
actual.....(ACFM)	484604	487758	506075
dry standard.....(DSCFM)	226198	227633	237012
Isokinetic variation.....(%)	101.5	99.5	99.2
Particulate concentration...			
actual.....(GR/ACF)	0.07763	0.04427	0.06744
dry standard.....(GR/DSCF)	0.16639	0.09490	0.14406
Particle mass rate...(LB/HR)	322.597	185.161	292.664

Test No. 10
No. 12 Pelletizer Waste Gas Stack

(ELECTRICS ON)

Results of Particulate Loading Determinations-----Method 5

	Run 1 05-25-94	Run 2 05-25-94	Run 3 05-25-94
Date of run			
Time run start/end.....(HRS)	925/1027	1110/1212	1255/1357
Static pressure.....(IN.WC)	-0.25	-0.25	-0.25
Cross sectional area (SQ.FT)	27.88	27.88	27.88
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	210.0	200.0	208.0
desiccant.....(GRAMS)	25.0	1.0	15.0
total.....(GRAMS)	235.0	201.0	223.0
Total particulate material..			
.....collected(grams)	0.1247	0.0939	0.0795
Gas meter coefficient.....	0.9980	0.9980	0.9980
Barometric pressure..(IN.HG)	28.92	28.92	28.92
Avg. orif.pres.drop..(IN.WC)	2.40	1.90	1.89
Avg. gas meter temp..(DEF-F)	83.0	83.8	84.7
Volume through gas meter....			
at meter conditions...(CF)	51.20	47.61	47.45
standard conditions.(DSCF)	48.30	44.79	44.56
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.248	.248	.248
Avg.stack gas temp ..(DEG-F)	132	138	140
Volumetric flow rate.....			
actual.....(ACFM)	89859	89155	90231
dry standard.....(DSCFM)	64551	62729	62059
Isokinetic variation.....(%)	103.7	99.0	99.5
Particulate concentration...			
actual.....(GR/ACF)	0.02861	0.02275	0.01892
dry standard.....(GR/DSCF)	0.03984	0.03235	0.02753
Particle mass rate...(LB/HR)	22.042	17.393	14.642

Test No. 12
No. 12 Pelletizer Waste Gas Stack
(ELECTRICS OFF)

Results of Particulate Loading Determinations-----Method 5

	Run 1 05-25-94	Run 2 05-25-94	Run 3 05-25-94
Date of run			
Time run start/end.....(HRS)	1430/1532	1557/1700	1723/1825
Static pressure.....(IN.WC)	-0.25	-0.25	-0.25
Cross sectional area (SQ.FT)	27.88	27.88	27.88
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	198.0	211.0	200.0
desiccant.....(GRAMS)	27.0	20.0	48.0
total.....(GRAMS)	225.0	231.0	248.0
Total particulate material..			
.....collected(grams)	0.1051	0.1313	0.0882
Gas meter coefficient.....	0.9980	0.9980	0.9980
Barometric pressure..(IN.HG)	28.92	28.92	28.92
Avg. orif.pres.drop..(IN.WC)	1.87	1.87	1.88
Avg. gas meter temp..(DEF-F)	85.1	87.5	88.8
Volume through gas meter....			
at meter conditions...(CF)	47.25	47.37	47.27
standard conditions.(DSCF)	44.34	44.26	44.06
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.248	.248	.248
Avg.stack gas temp ..(DEG-F)	139	138	138
Volumetric flow rate.....			
actual.....(ACFM)	89721	89524	89040
dry standard.....(DSCFM)	61671	61752	61258
Isokinetic variation.....(%)	99.7	99.3	99.7
Particulate concentration...			
actual.....(GR/ACF)	0.02513	0.03156	0.02124
dry standard.....(GR/DSCF)	0.03657	0.04577	0.03089
Particle mass rate...(LB/HR)	19.333	24.229	16.217

Test No. 15
No. 1104 Pelletizer Waste Gas Stack

(ELECTRICS ON)

Results of Particulate Loading Determinations-----Method 5

	Run 1	Run 2	Run 3
Date of run	05-26-94	05-26-94	05-26-94
Time run start/end.....(HRS)	810/ 912	955/1057	1140/1242
Static pressure.....(IN.WC)	-0.22	-0.22	-0.22
Cross sectional area (SQ.FT)	27.49	27.49	27.49
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	166.0	170.0	172.0
desiccant.....(GRAMS)	19.0	17.0	16.0
total.....(GRAMS)	185.0	187.0	188.0
Total particulate material..			
.....collected(grams)	0.0790	0.2586	0.0299
Gas meter coefficient.....	0.9980	0.9980	0.9980
Barometric pressure..(IN.HG)	29.46	29.46	29.46
Avg. orif.pres.drop..(IN.WC)	2.38	2.22	2.32
Avg. gas meter temp..(DEF-F)	81.0	81.9	81.0
Volume through gas meter....			
at meter conditions...(CF)	51.99	50.44	51.46
standard conditions.(DSCF)	50.14	48.54	49.62
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.248	.248	.248
Avg.stack gas temp ..(DEG-F)	141	146	144
Volumetric flow rate.....			
actual.....(ACFM)	94255	91314	93630
dry standard.....(DSCFM)	69427	66236	68343
Isokinetic variation.....(%)	98.7	100.2	99.2
Particulate concentration...			
actual.....(GR/ACF)	0.01790	0.05960	0.00678
dry standard.....(GR/DSCF)	0.02431	0.08220	0.00930
Particle mass rate...(LB/HR)	14.468	46.669	5.447

Test No. 16
No. 1105 Pelletizer Waste Gas Stack
(ELECTRICS ON)

Results of Particulate Loading Determinations-----Method 5

	Run 1 05-26-94	Run 2 05-26-94	Run 3 05-26-94
Date of run			
Time run start/end.....(HRS)	810/ 912	955/1057	1140/1241
Static pressure.....(IN.WC)	-0.21	-0.21	-0.21
Cross sectional area (SQ.FT)	27.49	27.49	27.49
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	131.0	143.0	173.0
desiccant.....(GRAMS)	23.0	12.0	14.0
total.....(GRAMS)	154.0	155.0	187.0
Total particulate material..			
.....collected(grams)	0.0313	0.0257	0.1029
Gas meter coefficient.....	0.9983	0.9983	0.9983
Barometric pressure..(IN.HG)	29.46	29.46	29.46
Avg. orif.pres.drop..(IN.WC)	2.41	2.60	2.57
Avg. gas meter temp..(DEF-F)	76.1	83.5	84.9
Volume through gas meter....			
at meter conditions...(CF)	52.75	55.03	54.78
standard conditions.(DSCF)	51.35	52.87	52.49
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.248	.248	.248
Avg.stack gas temp ..(DEG-F)	146	150	156
Volumetric flow rate.....			
actual.....(ACFM)	98118	97737	98333
dry standard.....(DSCFM)	73739	73133	71070
Isokinetic variation.....(%)	95.2	98.8	100.9
Particulate concentration...			
actual.....(GR/ACF)	0.00706	0.00561	0.02185
dry standard.....(GR/DSCF)	0.00940	0.00750	0.03025
Particle mass rate...(LB/HR)	5.944	4.702	18.427

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Test No. 19
Dry Cobber Stack

Results of Particulate Loading Determinations-----Method 5

	Run 1 05-26-94	Run 2 05-26-94	Run 3 05-26-94
Date of run			
Time run start/end.....(HRS)	1000/1101	1115/1216	1225/1326
Static pressure.....(IN.WC)	-0.86	-0.86	-0.86
Cross sectional area (SQ.FT)	20.46	20.46	20.46
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	1.0	1.0	1.0
desiccant.....(GRAMS)	29.0	31.0	30.0
total.....(GRAMS)	30.0	32.0	31.0
Total particulate material.. collected(grams)	0.0096	0.0084	0.0100
Gas meter coefficient.....	1.0066	1.0066	1.0066
Barometric pressure..(IN.HG)	29.46	29.46	29.46
Avg. orif.pres.drop..(IN.WC)	1.27	1.27	1.30
Avg. gas meter temp..(DEF-F)	70.2	80.6	85.1
Volume through gas meter....			
at meter conditions...(CF)	37.29	37.58	38.30
standard conditions.(DSCF)	36.91	36.48	36.87
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.185	.185	.185
Avg.stack gas temp ..(DEG-F)	65	65	64
Volumetric flow rate.....			
actual.....(ACFM)	69262	68907	69455
dry standard.....(DSCFM)	66910	66670	67430
Isokinetic variation.....(%)	100.8	100.0	100.0
Particulate concentration...			
actual.....(GR/ACF)	0.00388	0.00344	0.00406
dry standard.....(GR/DSCF)	0.00401	0.00355	0.00418
Particle mass rate...(LB/HR)	2.302	2.030	2.419

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Test No. 20
No. 2 Fine Crusher Stack

Results of Particulate Loading Determinations-----Method 5

	Run 1 05-25-94	Run 2 05-25-94	Run 3 05-25-94
Date of run			
Time run start/end.....(HRS)	944/1059	1113/1214	1225/1327
Static pressure.....(IN.WC)	-0.22	-0.22	-0.22
Cross sectional area (SQ.FT)	5.50	5.50	5.50
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	3.0	4.0	4.0
desiccant.....(GRAMS)	22.0	17.0	17.0
total.....(GRAMS)	25.0	21.0	21.0
Total particulate material.. collected(grams)	0.0179	0.0072	0.0086
Gas meter coefficient.....	1.0078	1.0078	1.0078
Barometric pressure..(IN.HG)	28.80	28.80	28.80
Avg. orif.pres.drop..(IN.WC)	3.14	3.22	3.24
Avg. gas meter temp..(DEF-F)	73.5	78.2	78.3
Volume through gas meter....			
at meter conditions...(CF)	59.35	60.34	60.50
standard conditions.(DSCF)	57.41	57.87	58.02
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.248	.248	.248
Avg.stack gas temp ..(DEG-F)	68	65	63
Volumetric flow rate.....			
actual.....(ACFM)	16647	16679	16649
dry standard.....(DSCFM)	15695	15868	15896
Isokinetic variation.....(%)	100.0	99.7	99.8
Particulate concentration...			
actual.....(GR/ACF)	0.00453	0.00183	0.00218
dry standard.....(GR/DSCF)	0.00481	0.00192	0.00229
Particle mass rate...(LB/HR)	0.647	0.261	0.312

Test No. 21
Bin Storage Stack

Results of Particulate Loading Determinations-----Method 5

	Run 1	Run 2	Run 3
Date of run	05-25-94	05-25-94	05-25-94
Time run start/end.....(HRS)	945/1048	1100/1202	1215/1316
Static pressure.....(IN.WC)	-0.68	-0.68	-0.68
Cross sectional area (SQ.FT)	8.51	8.51	8.51
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	4.0	2.0	3.0
desiccant.....(GRAMS)	9.0	14.0	8.0
total.....(GRAMS)	13.0	16.0	11.0
Total particulate material..			
.....collected(grams)	0.0122	0.0088	0.0133
Gas meter coefficient.....	1.0066	1.0066	1.0066
Barometric pressure..(IN.HG)	28.92	28.92	28.92
Avg. orif.pres.drop..(IN.WC)	1.42	1.45	1.46
Avg. gas meter temp..(DEF-F)	62.3	69.9	72.6
Volume through gas meter....			
at meter conditions...(CF)	39.56	40.18	40.44
standard conditions.(DSCF)	39.04	39.08	39.14
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.185	.185	.185
Avg.stack gas temp ..(DEG-F)	72	74	73
Volumetric flow rate.....			
actual.....(ACFM)	31412	31658	31730
dry standard.....(DSCFM)	29637	29634	29925
Isokinetic variation.....(%)	100.1	100.3	99.4
Particulate concentration...			
actual.....(GR/ACF)	0.00455	0.00325	0.00494
dry standard.....(GR/DSCF)	0.00482	0.00347	0.00524
Particle mass rate...(LB/HR)	1.225	0.883	1.345

Test No. 23
No. 2 Boiler Stack

Results of Particulate Loading Determinations-----Method 5

	Run 1	Run 2	Run 3
Date of run	05-27-94	05-27-94	05-27-94
Time run start/end.....(HRS)	803/ 908	932/1044	1115/1218
Static pressure.....(IN.WC)	-0.97	-0.97	-0.97
Cross sectional area (SQ.FT)	66.00	66.00	66.00
Pitot tube coefficient.....	.840	.840	.840
Water in sample gas			
condenser.....(ML)	0.0	0.0	0.0
impingers.....(GRAMS)	82.0	82.0	101.0
desiccant.....(GRAMS)	19.0	17.0	9.0
total.....(GRAMS)	101.0	99.0	110.0
Total particulate material..			
.....collected(grams)	0.0590	0.0337	0.0617
Gas meter coefficient.....	1.0078	1.0078	1.0078
Barometric pressure..(IN.HG)	29.40	29.40	29.40
Avg. orif.pres.drop..(IN.WC)	2.13	2.04	2.12
Avg. gas meter temp..(DEF-F)	59.8	69.8	75.5
Volume through gas meter....			
at meter conditions...(CF)	47.92	47.19	48.28
standard conditions.(DSCF)	48.44	46.79	47.37
Total sampling time....(MIN)	60.00	60.00	60.00
Nozzle diameter.....(IN)	.247	.247	.247
Avg.stack gas temp ..(DEG-F)	280	286	285
Volumetric flow rate.....			
actual.....(ACFM)	247542	246662	249645
dry standard.....(DSCFM)	157735	155547	156275
Isokinetic variation.....(%)	101.6	99.5	100.3
Particulate concentration...			
actual.....(GR/ACF)	0.01197	0.00701	0.01258
dry standard.....(GR/DSCF)	0.01879	0.01111	0.02010
Particle mass rate...(LB/HR)	25.409	14.816	26.919
F-factor(DSCF/MMBTU)	9780	9780	9780
Emission factor...(LB/MMBTU)	0.045	0.027	0.048

3.3 Results of Sulfur Dioxide Determinations

Test No. 1

No. 12 Pelletizer Hood Exhaust Inlet - ELECTRICS ON

Results of Sulfur Dioxide Determinations

	Run 1	Run 2	Run 3
Date of run	5-24-94	5-24-94	5-24-94
Time run start/end (HRS)	0953-1051	1148-1246	1328-1452
Volumetric Flow Rate (DSCFM)	235033	237667	234018
Oxygen content (%v/v,d)	20.58	20.06	20.06
Moisture Content (%v/v)	8.24	9.38	8.90

Sulfur Dioxide

concentration (ppm,d)	4	12	12
emission rate (LB/HR)	9.4	28	28

Test No. 7

No. 12 Pelletizer Hood Exhaust Inlet - ELECTRICS OFF

Results of Sulfur Dioxide Determinations

	Run 1	Run 2	Run 3
Date of run	5-24-94	5-24-94	5-24-94
Time run start/end (HRS)	1523-1621	1643-1741	1808-1906
Volumetric Flow Rate (DSCFM)	229235	227040	227251
Oxygen content (%v/v,d)	20.03	20.07	20.03
Moisture Content (%v/v)	10.29	8.89	10.46

Sulfur Dioxide

concentration (ppm,d)	14	14	14
emission rate (LB/HR)	32	32	32

Test No. 2

No. 12 Pelletizer Hood Exhaust Stack - ELECTRICS ON

Results of Sulfur Dioxide Determinations

	Run 1	Run 2	Run 3
Date of run	5-24-94	5-24-94	5-24-94
Time run start/end (HRS)	0954-1052	1149-1247	1329-1453
Volumetric Flow Rate (DSCFM)	62062	61536	61812
Oxygen content (%v/v,d)	20.2	20.2	20.2
Moisture Content (%v/v)	10.64	11.20	11.35

Sulfur Dioxide

concentration (ppm,d)	4	4	2
emission rate (LB/HR)	2.5	2.5	1.2

Test No. 6

No. 12 Pelletizer Hood Exhaust Stack - ELECTRICS OFF

Results of Sulfur Dioxide Determinations

	Run 1	Run 2	Run 3
Date of run	5-24-94	5-24-94	5-24-94
Time run start/end (HRS)	1524-1622	1644-1742	1809-1907
Volumetric Flow Rate (DSCFM)	63577	62321	61825
Oxygen content (%v/v,d)	20.3	20.3	20.3
Moisture Content (%v/v)	10.01	11.07	12.04

Sulfur Dioxide

concentration (ppm,d)	1	3	4
emission rate (LB/HR)	0.63	1.9	2.5

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Test No. 8

No. 12 Pelletizer Waste Gas Inlet - ELECTRICS ON

Results of Sulfur Dioxide Determinations

	Run 1	Run 2	Run 3
Date of run	5-25-94	5-25-94	5-25-94
Time run start/end (HRS)	0928-1026	1113-1211	1258-1356
Volumetric Flow Rate (DSCFM)	240245	233917	213505
Oxygen content (%v/v,d)	16.70	16.69	16.81
Moisture Content (%v/v)	6.00	5.53	5.78

Sulfur Dioxide

concentration (ppm,d)	6	6	6
emission rate (LB/HR)	14	14	13

Test No. 9

No. 12 Pelletizer Waste Gas Inlet - ELECTRICS OFF

Results of Sulfur Dioxide Determinations

	Run 1	Run 2	Run 3
Date of run	5-25-94	5-25-94	5-25-94
Time run start/end (HRS)	1433-1531	1600-1658	1726-1824
Volumetric Flow Rate (DSCFM)	226198	227633	237012
Oxygen content (%v/v,d)	16.63	16.62	16.61
Moisture Content (%v/v)	7.36	7.71	7.53

Sulfur Dioxide

concentration (ppm,d)	7	7	3
emission rate (LB/HR)	16	16	7.1

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Test No. 10

No. 12 Pelletizer Waste Gas Stack - ELECTRICS ON

Results of Sulfur Dioxide Determinations

	Run 1	Run 2	Run 3
Date of run	5-25-94	5-25-94	5-25-94
Time run start/end (HRS)	0929-1027	1114-1212	1259-1357
Volumetric Flow Rate (DSCFM)	64551	62729	62059
Oxygen content (%v/v,d)	16.74	16.77	16.65
Moisture Content (%v/v)	16.59	17.46	19.09

Sulfur Dioxide

concentration (ppm,d)	2	< 1	< 1
emission rate (LB/HR)	1.3	< 0.63	< 0.62

Test No. 12

No. 12 Pelletizer Waste Gas Stack - ELECTRICS OFF

Results of Sulfur Dioxide Determinations

	Run 1	Run 2	Run 3
Date of run	5-25-94	5-25-94	5-25-94
Time run start/end (HRS)	1434-1532	1600-1658	1727-1825
Volumetric Flow Rate (DSCFM)	61671	61752	61258
Oxygen content (%v/v,d)	16.68	16.69	16.71
Moisture Content (%v/v)	19.31	19.17	19.34

Sulfur Dioxide

concentration (ppm,d)	< 1	< 1	< 1
emission rate (LB/HR)	< 0.62	< 0.62	< 0.62

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Test No. 15

No. 1104 Pelletizer Waste Gas Stack - ELECTRICS ON

Results of Sulfur Dioxide Determinations

	Run 1	Run 2	Run 3
Date of run	5-26-94	5-26-94	5-26-94
Time run start/end (HRS)	0814-0913	0959-1058	1144-1242
Volumetric Flow Rate (DSCFM)	69427	66236	68343
Oxygen content (%v/v,d)	17.39	17.12	17.19
Moisture Content (%v/v)	14.82	15.37	15.16

Sulfur Dioxide

concentration (ppm,d)	< 1	< 1	3.1
emission rate (LB/HR)	< 0.69	< 0.66	2.1

Test No. 16

No. 1105 Pelletizer Waste Gas Stack - ELECTRICS ON

Results of Sulfur Dioxide Determinations

	Run 1	Run 2	Run 3
Date of run	5-26-94	5-26-94	5-26-94
Time run start/end (HRS)	0811-0912	0956-1057	1141-1241
Volumetric Flow Rate (DSCFM)	73739	73133	71070
Oxygen content (%v/v,d)	17.43	17.11	17.09
Moisture Content (%v/v)	12.39	12.14	14.38

Sulfur Dioxide

concentration (ppm,d)	4	4	2
emission rate (LB/HR)	2.9	2.9	1.4

Test No. 23
 No. 2 Boiler Stack

Results of Sulfur Dioxide Determinations

	Run 1	Run 2	Run 3
Date of run	5-27-94	5-27-94	5-27-94
Time run start/end (HRS)	0843-0941	1003-1101	1118-1216
Volumetric Flow Rate (DSCFM)	157735	155547	156275
Oxygen content (%v/v,d)	8.72	9.00	8.61
Moisture Content (%v/v)	8.95	9.07	9.87
Sulfur Dioxide			
concentration (ppm,d)	204	207	209
emission rate (LB/HR)	321	321	326
emission factor (LB/10 ⁶ BTU)	0.608	0.617	0.623

3.4 Results of Oxides of Nitrogen Determinations

Test No. 1

No. 12 Pelletizer Hood Exhaust Inlet - ELECTRICS ON

Results of Oxides of Nitrogen Determinations

	Run 1	Run 2	Run 3
Date of run	5-24-94	5-24-94	5-24-94
Time run start/end (HRS)	0953-1051	1148-1246	1328-1452
Volumetric Flow Rate (DSCFM)	235033	237667	234018
Oxygen content (%v/v,d)	20.58	20.06	20.06
Moisture Content (%v/v)	8.24	9.38	8.90

Oxides of Nitrogen

concentration (ppm,d)	1	14	14
emission rate (LB/HR)	1.7	24	23

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Test No. 7

No. 12 Pelletizer Hood Exhaust Inlet - ELECTRICS OFF

Results of Oxides of Nitrogen Determinations

	Run 1	Run 2	Run 3
Date of run	5-24-94	5-24-94	5-24-94
Time run start/end (HRS)	1523-1621	1643-1741	1808-1906
Volumetric Flow Rate (DSCFM)	229235	227040	227251
Oxygen content (%v/v,d)	20.03	20.07	20.03
Moisture Content (%v/v)	10.29	8.89	10.46

Oxides of Nitrogen

concentration (ppm,d)	15	14	14
emission rate (LB/HR)	25	23	23

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Test No. 2

No. 12 Pelletizer Hood Exhaust Stack - ELECTRICS ON

Results of Oxides of Nitrogen Determinations

	Run 1	Run 2	Run 3
Date of run	5-24-94	5-24-94	5-24-94
Time run start/end (HRS)	0954-1052	1149-1247	1329-1453
Volumetric Flow Rate (DSCFM)	62062	61536	61812
Oxygen content (%v/v,d)	20.2	20.2	20.2
Moisture Content (%v/v)	10.64	11.20	11.35

Oxides of Nitrogen

concentration (ppm,d)	6	6	5
emission rate (LB/HR)	2.7	2.6	2.2

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Test No. 6

No. 12 Pelletizer Hood Exhaust Stack - ELECTRICS OFF

Results of Oxides of Nitrogen Determinations

	Run 1	Run 2	Run 3
Date of run	5-24-94	5-24-94	5-24-94
Time run start/end (HRS)	1524-1622	1644-1742	1809-1907
Volumetric Flow Rate (DSCFM)	63577	62321	61825
Oxygen content (%v/v,d)	20.3	20.3	20.3
Moisture Content (%v/v)	10.01	11.07	12.04

Oxides of Nitrogen

concentration (ppm,d)	5	5	6
emission rate (LB/HR)	2.3	2.2	2.7

Test No. 8

No. 12 Pelletizer Waste Gas Inlet - ELECTRICS ON

Results of Oxides of Nitrogen Determinations

	Run 1	Run 2	Run 3
Date of run	5-25-94	5-25-94	5-25-94
Time run start/end (HRS)	0928-1026	1113-1211	1258-1356
Volumetric Flow Rate (DSCFM)	240245	233917	213505
Oxygen content (%v/v,d)	16.70	16.69	16.81
Moisture Content (%v/v)	6.00	5.53	5.78

Oxides of Nitrogen

concentration (ppm,d)	104	108	110
emission rate (LB/HR)	179	181	168

Test No. 9

No. 12 Pelletizer Waste Gas Inlet - ELECTRICS OFF

Results of Oxides of Nitrogen Determinations

	Run 1	Run 2	Run 3
Date of run	5-25-94	5-25-94	5-25-94
Time run start/end (HRS)	1433-1531	1600-1658	1726-1824
Volumetric Flow Rate (DSCFM)	226198	227633	237012
Oxygen content (%v/v,d)	16.63	16.62	16.61
Moisture Content (%v/v)	7.36	7.71	7.53
Oxides of Nitrogen			
concentration (ppm,d)	110	109	107
emission rate (LB/HR)	178	178	182

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Test No. 10

No. 12 Pelletizer Waste Gas Stack - ELECTRICS ON

Results of Oxides of Nitrogen Determinations

	Run 1	Run 2	Run 3
Date of run	5-25-94	5-25-94	5-25-94
Time run start/end (HRS)	0929-1027	1114-1212	1259-1357
Volumetric Flow Rate (DSCFM)	64551	62729	62059
Oxygen content (%v/v,d)	16.74	16.77	16.65
Moisture Content (%v/v)	16.59	17.46	19.09

Oxides of Nitrogen

concentration (ppm,d)	108	108	105
emission rate (LB/HR)	50	50	47

Test No. 12
 No. 12 Pelletizer Waste Gas Stack - ELECTRICS OFF

Results of Oxides of Nitrogen Determinations

	Run 1	Run 2	Run 3
Date of run	5-25-94	5-25-94	5-25-94
Time run start/end (HRS)	1434-1532	1600-1658	1727-1825
Volumetric Flow Rate (DSCFM)	61671	61752	61258
Oxygen content (%v/v,d)	16.68	16.69	16.71
Moisture Content (%v/v)	19.31	19.17	19.34

Oxides of Nitrogen

concentration (ppm,d)	105	104	103
emission rate (LB/HR)	46	46	45

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Test No. 15

No. 1104 Pelletizer Waste Gas Stack - ELECTRICS ON

Results of Oxides of Nitrogen Determinations

	Run 1	Run 2	Run 3
Date of run	5-26-94	5-26-94	5-26-94
Time run start/end (HRS)	0814-0913	0959-1058	1144-1242
Volumetric Flow Rate (DSCFM)	69427	66236	68343
Oxygen content (%v/v,d)	17.39	17.12	17.19
Moisture Content (%v/v)	14.82	15.37	15.16

Oxides of Nitrogen

concentration (ppm,d)	83	84	90
emission rate (LB/HR)	41	40	44

Test No. 16

No. 1105 Pelletizer Waste Gas Stack - ELECTRICS ON

Results of Oxides of Nitrogen Determinations

	Run 1	Run 2	Run 3
Date of run	5-26-94	5-26-94	5-26-94
Time run start/end (HRS)	0811-0912	0956-1057	1141-1241
Volumetric Flow Rate (DSCFM)	73739	73133	71070
Oxygen content (%v/v,d)	17.43	17.11	17.09
Moisture Content (%v/v)	12.39	12.14	14.38

Oxides of Nitrogen

concentration (ppm,d)	77	86	87
emission rate (LB/HR)	41	45	44

Test No. 23

No. 2 Boiler Stack

Results of Oxides of Nitrogen Determinations

	Run 1	Run 2	Run 3
Date of run	5-27-94	5-27-94	5-27-94
Time run start/end (HRS)	0843-0941	1003-1101	1118-1216
Volumetric Flow Rate (DSCFM)	157735	155547	156275
Oxygen content (%v/v,d)	8.72	9.00	8.61
Moisture Content (%v/v)	8.95	9.07	9.87

Oxides of Nitrogen

concentration (ppm,d)	344	309	327
emission rate (LB/HR)	389	344	366
emission factor (LB/10 ⁶ BTU)	0.737	0.662	0.700

3.5 Results of Opacity Observations

Test No. 5
No. 12 Pelletizer North Rotoclone Stack

Results of Opacity Observations ----- EPA Method 9

PERCENT OPACITY	OPTICAL DENSITY	RELATIVE FREQUENCY (%)
0	0.0000	100.00
5	0.0223	0.00
10	0.0458	0.00
15	0.0706	0.00
20	0.0969	0.00
25	0.1249	0.00
30	0.1549	0.00
35	0.1871	0.00
40	0.2219	0.00
45	0.2596	0.00
50	0.3010	0.00
55	0.3468	0.00
60	0.3979	0.00
65	0.4559	0.00
70	0.5229	0.00
75	0.6021	0.00
80	0.6690	0.00
85	0.8239	0.00
90	1.0000	0.00
95	1.3010	0.00
99	2.0000	0.00
Avg Opac 0.00	Avg OD 0.0000	Time average

Observer: Edward Trowbridge
Cert. Date: 04-07-94
Date of Observation: 05-26-94
Time of Observation: 0815/0915

Test No. 19
Dry Cobber Stack

Results of Opacity Observations ----- EPA Method 9

PERCENT OPACITY	OPTICAL DENSITY	RELATIVE FREQUENCY (%)
0	0.0000	100.00
5	0.0223	0.00
10	0.0458	0.00
15	0.0706	0.00
20	0.0969	0.00
25	0.1249	0.00
30	0.1549	0.00
35	0.1871	0.00
40	0.2219	0.00
45	0.2596	0.00
50	0.3010	0.00
55	0.3468	0.00
60	0.3979	0.00
65	0.4559	0.00
70	0.5229	0.00
75	0.6021	0.00
80	0.6690	0.00
85	0.8239	0.00
90	1.0000	0.00
95	1.3010	0.00
99	2.0000	0.00
Avg Opac 0.00	Avg OD 0.0000	Time average

Observer: Edward Trowbridge
Cert. Date: 04-07-94
Date of Observation: 05-26-94
Time of Observation: 1105/1205

Test No. 20
Fine Crusher Stack

Results of Opacity Observations ----- EPA Method 9

PERCENT OPACITY	OPTICAL DENSITY	RELATIVE FREQUENCY (%)
0	0.0000	100.00
5	0.0223	0.00
10	0.0458	0.00
15	0.0706	0.00
20	0.0969	0.00
25	0.1249	0.00
30	0.1549	0.00
35	0.1871	0.00
40	0.2219	0.00
45	0.2596	0.00
50	0.3010	0.00
55	0.3468	0.00
60	0.3979	0.00
65	0.4559	0.00
70	0.5229	0.00
75	0.6021	0.00
80	0.6690	0.00
85	0.8239	0.00
90	1.0000	0.00
95	1.3010	0.00
99	2.0000	0.00
Avg Opac 0.00	Avg OD 0.0000	Time average

Observer: Edward Trowbridge
Cert. Date: 04-07-94
Date of Observation: 05-26-94
Time of Observation: 1315/1415

Test No. 21
Bin Storage Stack

Results of Opacity Observations ----- EPA Method 9

PERCENT OPACITY	OPTICAL DENSITY	RELATIVE FREQUENCY (%)
0	0.0000	0.00
5	0.0223	0.00
10	0.0458	0.00
15	0.0706	0.00
20	0.0969	0.00
25	0.1249	0.00
30	0.1549	0.00
35	0.1871	0.00
40	0.2219	0.00
45	0.2596	0.00
50	0.3010	0.00
55	0.3468	0.00
60	0.3979	0.00
65	0.4559	0.00
70	0.5229	0.00
75	0.6021	0.00
80	0.6690	0.00
85	0.8239	0.00
90	1.0000	0.00
95	1.3010	0.00
99	2.0000	0.00
Avg Opac 0.00	Avg OD 0.0000	Time average

Observer: Edward Trowbridge
Cert. Date: 04-07-94
Date of Observation: 05-26-94
Time of Observation: 1000/1100

Test No. 23
No. 2 Boiler Stack

Results of Opacity Observations ----- EPA Method 9

PERCENT OPACITY	OPTICAL DENSITY	RELATIVE FREQUENCY (%)
0	0.0000	80.42
5	0.0223	19.58
10	0.0458	0.00
15	0.0706	0.00
20	0.0969	0.00
25	0.1249	0.00
30	0.1549	0.00
35	0.1871	0.00
40	0.2219	0.00
45	0.2596	0.00
50	0.3010	0.00
55	0.3468	0.00
60	0.3979	0.00
65	0.4559	0.00
70	0.5229	0.00
75	0.6021	0.00
80	0.6690	0.00
85	0.8239	0.00
90	1.0000	0.00
95	1.3010	0.00
99	2.0000	0.00
Avg Opac 0.98	Avg OD 0.0044	Time average

Observer: David Vaaler
Cert. Date: 04-06-94
Date of Observation: 05-27-94
Time of Observation: 0805/0905

APPENDIX A

VOLUMETRIC FLOW RATE DETERMINATIONS

Test No. 1
No. 12 Pelletizer Hood Exhaust Inlet

Results of Volumetric Flow Rate Determination-----Method 2

Date of Determination.....	05-24-94
Time of Determination.....(HRS)	912
Barometric pressure.....(IN.HG)	29.18
Pitot tube coefficient.....	.84
Number of sampling ports.....	4
Total number of points.....	24
Shape of duct.....	Rectangular
Duct width.....(IN)	84
Duct length.....(IN)	113
Duct area.....(SQ.FT)	65.92
Direction of flow.....	UP
Static pressure.....(IN.WC)	1.55
Avg. gas temp.....(DEG-F)	205
Moisture content.....(% V/V)	8.24
Avg. linear velocity.....(FT/SEC)	84.6
Gas density.....(LB/ACF)	.05641
Molecular weight.....(LB/LBMOLE)	28.83
Mass flow of gas.....(LB/HR)	1132719
Volumetric flow rate.....	
actual.....(ACFM)	334682
dry standard.....(DSCFM)	238742

Test No. 2
No. 12 Pelletizer Hood Exhaust Stack

Results of Volumetric Flow Rate Determination-----Method 2

Date of Determination.....	05-24-94
Time of Determination.....(HRS)	900
Barometric pressure.....(IN.HG)	29.28
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	24
Shape of duct.....	Round
Stack diameter.....(IN)	70
Duct area.....(SQ.FT)	26.73
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.38
Avg. gas temp.....(DEG-F)	129
Moisture content.....(% V/V)	10.64
Avg. linear velocity.....(FT/SEC)	49.3
Gas density.....(LB/ACF)	.06310
Molecular weight.....(LB/LBMOLE)	28.86
Mass flow of gas.....(LB/HR)	299075
Volumetric flow rate.....	
actual.....(ACFM)	78994
dry standard.....(DSCFM)	61920

Test No. 4
No. 12 Pelletizer North Rotoclone Inlet

Results of Volumetric Flow Rate Determination-----Method 2

Date of Determination.....	05-24-94
Time of Determination.....(HRS)	800
Barometric pressure.....(IN.HG)	29.18
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	24
Shape of duct.....	Round
Stack diameter.....(IN)	47
Duct area.....(SQ.FT)	12.05
Direction of flow.....	DOWN
Static pressure.....(IN.WC)	-2.4
Avg. gas temp.....(DEG-F)	354
Moisture content.....(% V/V)	1.66
Avg. linear velocity.....(FT/SEC)	95.9
Gas density.....(LB/ACF)	.04680
Molecular weight.....(LB/LBMOLE)	28.84
Mass flow of gas.....(LB/HR)	194665
Volumetric flow rate.....	
actual.....(ACFM)	69325
dry standard.....(DSCFM)	42868

Test No. 5
No. 12 Pelletizer North Rotoclone Stack

Results of Volumetric Flow Rate Determination-----Method 2

Date of Determination.....	05-24-94
Time of Determination.....(HRS)	736
Barometric pressure.....(IN.HG)	29.18
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	20
Shape of duct.....	Round
Stack diameter.....(IN)	45.5
Duct area.....(SQ.FT)	11.29
Direction of flow.....	UP
Static pressure.....(IN.WC)	-1.05
Avg. gas temp.....(DEG-F)	54
Moisture content.....(% V/V)	1.62
Avg. linear velocity.....(FT/SEC)	81.0
Gas density.....(LB/ACF)	.07432
Molecular weight.....(LB/LBMOLE)	28.84
Mass flow of gas.....(LB/HR)	244749
Volumetric flow rate.....	
actual.....(ACFM)	54885
dry standard.....(DSCFM)	53912

Test No. 7
No. 12 Pelletizer Hood Exhaust Inlet

Results of Volumetric Flow Rate Determination-----Method 2

Date of Determination.....	05-24-94
Time of Determination.....(HRS)	1453
Barometric pressure.....(IN.HG)	29.18
Pitot tube coefficient.....	.84
Number of sampling ports.....	4
Total number of points.....	24
Shape of duct.....	Rectangular
Duct width.....(IN)	84
Duct length.....(IN)	113
Duct area.....(SQ.FT)	65.92
Direction of flow.....	UP
Static pressure.....(IN.WC)	1.55
Avg. gas temp.....(DEG-F)	201
Moisture content.....(% V/V)	10.29
Avg. linear velocity.....(FT/SEC)	83.5
Gas density.....(LB/ACF)	.05626
Molecular weight.....(LB/LBMOLE)	28.82
Mass flow of gas.....(LB/HR)	1114542
Volumetric flow rate.....	
actual.....(ACFM)	330159
dry standard.....(DSCFM)	231637

Test No. 8
No. 12 Pelletizer Waste Gas Inlet

Results of Volumetric Flow Rate Determination-----Method 2

Date of Determination.....	05-25-94
Time of Determination.....(HRS)	900
Barometric pressure.....(IN.HG)	28.92
Pitot tube coefficient.....	.84
Number of sampling ports.....	5
Total number of points.....	25
Shape of duct.....	Rectangular
Duct width.....(IN)	92
Duct length.....(IN)	92
Duct area.....(SQ.FT)	58.78
Direction of flow.....	UP
Static pressure.....(IN.WC)	1.35
Avg. gas temp.....(DEG-F)	552
Moisture content.....(% V/V)	6.00
Avg. linear velocity.....(FT/SEC)	140.8
Gas density.....(LB/ACF)	.03725
Molecular weight.....(LB/LBMOLE)	29.00
Mass flow of gas.....(LB/HR)	1109657
Volumetric flow rate.....	
actual.....(ACFM)	496543
dry standard.....(DSCFM)	236179

Test No. 9
No. 12 Pelletizer Waste Gas Inlet

Results of Volumetric Flow Rate Determination-----Method 2

Date of Determination.....	05-25-94
Time of Determination.....(HRS)	900
Barometric pressure.....(IN.HG)	28.92
Pitot tube coefficient.....	.84
Number of sampling ports.....	5
Total number of points.....	25
Shape of duct.....	Rectangular
Duct width.....(IN)	92
Duct length.....(IN)	92
Duct area.....(SQ.FT)	58.78
Direction of flow.....	UP
Static pressure.....(IN.WC)	1.35
Avg. gas temp.....(DEG-F)	550
Moisture content.....(% V/V)	7.36
Avg. linear velocity.....(FT/SEC)	141.0
Gas density.....(LB/ACF)	.03713
Molecular weight.....(LB/LBMOLE)	29.01
Mass flow of gas.....(LB/HR)	1107979
Volumetric flow rate.....	
actual.....(ACFM)	497296
dry standard.....(DSCFM)	233583

Test No. 10
No. 12 Pelletizer Waste Gas Stack

Results of Volumetric Flow Rate Determination-----Method 2

Date of Determination.....	05-25-94
Time of Determination.....(HRS)	830
Barometric pressure.....(IN.HG)	28.92
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	24
Shape of duct.....	Round
Stack diameter.....(IN)	71.5
Duct area.....(SQ.FT)	27.88
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.25
Avg. gas temp.....(DEG-F)	134
Moisture content.....(% V/V)	16.59
Avg. linear velocity.....(FT/SEC)	53.8
Gas density.....(LB/ACF)	.06071
Molecular weight.....(LB/LBMOLE)	29.06
Mass flow of gas.....(LB/HR)	327647
Volumetric flow rate.....	
actual.....(ACFM)	89943
dry standard.....(DSCFM)	64412

Test No. 15
No. 1104 Pelletizer Waste Gas Stack

Results of Volumetric Flow Rate Determination-----Method 2

Date of Determination.....	05-26-94
Time of Determination.....(HRS)	750
Barometric pressure.....(IN.HG)	29.46
Pitot tube coefficient.....	.84
Number of sampling ports.....	4
Total number of points.....	24
Shape of duct.....	Round
Stack diameter.....(IN)	71
Duct area.....(SQ.FT)	27.49
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.22
Avg. gas temp.....(DEG-F)	140
Moisture content.....(% V/V)	14.82
Avg. linear velocity.....(FT/SEC)	57.6
Gas density.....(LB/ACF)	.06144
Molecular weight.....(LB/LBMOLE)	28.94
Mass flow of gas.....(LB/HR)	350166
Volumetric flow rate.....	
actual.....(ACFM)	94988
dry standard.....(DSCFM)	70068

Interpoll Labs Report No. 4-2971
Cyprus Northshore Mining
Silver Bay, MN

Test No. 19
Dry Cobber Stack

Results of Volumetric Flow Rate Determination-----Method 2

Date of Determination.....	05-26-94
Time of Determination.....(HRS)	950
Barometric pressure.....(IN.HG)	29.46
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	24
Shape of duct.....	Round
Stack diameter.....(IN)	61.25
Duct area.....(SQ.FT)	20.46
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.86
Avg. gas temp.....(DEG-F)	66
Moisture content.....(% V/V)	2.15
Avg. linear velocity.....(FT/SEC)	55.9
Gas density.....(LB/ACF)	.07334
Molecular weight.....(LB/LBMOLE)	28.84
Mass flow of gas.....(LB/HR)	301742
Volumetric flow rate.....	
actual.....(ACFM)	68572
dry standard.....(DSCFM)	66238

Test No. 20
No. 2 Fine Crusher Stack

Results of Volumetric Flow Rate Determination-----Method 2

Date of Determination.....	05-25-94
Time of Determination.....(HRS)	940
Barometric pressure.....(IN.HG)	28.8
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	12
Shape of duct.....	Round
Stack diameter.....(IN)	31.75
Duct area.....(SQ.FT)	5.50
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.22
Avg. gas temp.....(DEG-F)	66
Moisture content.....(% V/V)	2.01
Avg. linear velocity.....(FT/SEC)	50.3
Gas density.....(LB/ACF)	.07178
Molecular weight.....(LB/LBMOLE)	28.84
Mass flow of gas.....(LB/HR)	71530
Volumetric flow rate.....	
actual.....(ACFM)	16609
dry standard.....(DSCFM)	15716

Test No. 21
Bin Storage Stack

Results of Volumetric Flow Rate Determination-----Method 2

Date of Determination.....	05-25-94
Time of Determination.....(HRS)	730
Barometric pressure.....(IN.HG)	28.92
Pitot tube coefficient.....	.84
Number of sampling ports.....	2
Total number of points.....	24
Shape of duct.....	Round
Stack diameter.....(IN)	39.5
Duct area.....(SQ.FT)	8.51
Direction of flow.....	UP
Static pressure.....(IN.WC)	-.68
Avg. gas temp.....(DEG-F)	75
Moisture content.....(% V/V)	1.55
Avg. linear velocity.....(FT/SEC)	61.4
Gas density.....(LB/ACF)	.07093
Molecular weight.....(LB/LBMOLE)	28.84
Mass flow of gas.....(LB/HR)	133357
Volumetric flow rate.....	
actual.....(ACFM)	31335
dry standard.....(DSCFM)	29388

APPENDIX B

LOCATION OF TEST PORTS

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cyprus Date 5-25-94 Test 20 Run 1
Source No. 2 FINE CRUSHER STACK No. of traverse points 12
Method 5 Filter holder: 4" glass Filter type: glass fiber
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: .00 cfm at 12 in. Hg. (vac) ☒
P17070 @ 4.4 IN W.C.
Particulate Catch Data:

No. of filters used:

6414

Recovery solvent(s)

☒ acetone _____
☐ other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
R.R. / K.N.

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	495	492	3
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1456	1434	22
Total			25

Integrated Gas Sampling Data: NA

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

123093-G:\STACK\WP\METHODS\S-0046RR

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job CYPRUS Date 5-25-94 Source FASE CRUSHER STACK Operator R.B. / K.M. Pilot No. 23V-41 CP 840
 Meter Box No. 8 Inlet No. 2850 Bar. Press. 2850 Inlet No. 2850 H2O 2
 Gasometer count. 1.0078 Nozzle No. 10-4 Nozzle Dia. 248 In.

Transfer Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (in H ₂ O)	Driftless Meter (in H ₂ O)	Obs. Vol. (cf)	VAC. in Hg	Temperature (°F)				Oxygen (xv/v)
							Stack	Probe	Dry	Wet	
A-6	944	491.25	.74	2.93	5.98	9	76	267	251	33	20.9
	5	496.03	.78	3.12	0.90	10	74	255	254	36	20.9
	10	500.90	.79	3.16	5.84	10	74	230	253	38	20.9
	15	505.78	.85	3.44	1.00	12	68	230	249	38	20.9
	20	510.93	.79	3.84	6.02	11	64	245	249	39	20.9
B-6	25	515.98	.72	2.96	0.82	11	64	244	246	40	20.9
	30	520.83	.65	2.68	5.40	8	64	255	234	39	20.9
	35	525.44	.74	3.04	0.27	9	63	250	235	39	20.9
	40	530.26	.77	3.15	5.23	10	67	252	254	37	20.9
	45	535.17	.85	3.46	0.43	12	70	253	250	38	20.9
	50	540.38	.84	3.46	5.64	12	65	255	246	36	20.9
	55	545.57	.74	3.05	0.52	11	66	265	246	36	20.9
	60	550.60									
	(1051)										
V = 59.35							Avg. = 73.5				

349
6036
SP

4P5"

4P5"

4P5"

4P5"

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CYPRUS Date 5-25-94 Test 20 Run 2
Source No. 2 FINE CRUSHER STACK No. of traverse points 12
Method 5 Filter holder: 4" glass Filter type: glass fiber
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.00 cfm at 14 in. Hg. (vac) ☒
PZT075 @ 5.2 IN.W.C.
Particulate Catch Data:

No. of filters used:

6539

Recovery solvent(s)

☒ acetone _____
☐ other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
R.R. / K.W.

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	<u>495</u>	<u>491</u>	<u>4</u>
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	<u>1432</u>	<u>1415</u>	<u>17</u>
Total	<u>3X 21</u>		

Integrated Gas Sampling Data:

NA

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Cypress Operator R.R. / K.N. Pilot No. 23V-4' Cp 840
 Source 100-2 FIVE CRUSHER STAGE Meter Box No. 40078 Bar. Press. 28.80 InHg H₂O 2
 Date 5-13-94 Test 20 Run 2 Computer Count. 40078 Nozzle No. 10-4 Nozzle Dia. 20.9 IN.

Transfer Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inHg)	Orifice Meter (inHg)	Des. Vol. (cf)	VAC. (inHg)	Temperature (°F)				Gas/in	Gas/Dwt	Oxygen (xx/vv)
							Stack	Probe	Oven	lapp.			
B-6	1113	550.91	.70	2.88	5.64	9	64	232	228	34	75	73	20.9
	5	555.67	.74	3.03	0.51	9	66	233	230	35	78	74	20.9
	10	560.56	.78	3.23	5.54	10	62	245	231	40	80	75	20.9
	15	565.59	.85	3.52	0.79	12	63	247	238	39	81	75	20.9
	20	570.83	.84	3.44	5.99	12	69	244	241	37	81	76	20.9
A-6	25	576.05	.76	3.12	0.95	10	69	238	240	37	81	76	20.9
	30	580.97	.68	2.79	5.64	8	69	238	242	37	81	76	20.9
	35	585.62	.80	3.29	0.72	10	68	243	251	37	82	77	20.9
	40	590.66	.80	3.33	5.84	11	63	247	244	38	83	77	20.9
	45	595.77	.86	3.59	1.16	12	62	252	246	38	83	77	20.9
	50	601.14	.82	3.42	6.35	12	62	255	243	39	82	77	20.9
	55	606.36	.73	3.04	1.25	9	62	232	242	40	81	77	20.9
	60	611.25											
Σ = 60		Σ = 60.34		Σ = 3.22								Avg. = 78.2	

Bag House 4P

5"

5"

5"

5"

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CYPRUS Date 5-25-94 Test 20 Run 3
Source No. 2 FINE CRUSHER STACK No. of traverse points 12
Method 5 Filter holder: 4" glass Filter type: glass fiber
Sample Train Leak Check: _____

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: .00 cfm at 15 in. Hg. (vac) ☒
PITOTS C 4.1 IN W.C.
Particulate Catch Data:

No. of filters used:

6541

Recovery solvent(s)

☒ Acetone _____
☐ Other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
R.R. / K.N.

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	505	501	4
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1473	1456	17
Total			3121

Integrated Gas Sampling Data: NA

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

Cyprus
X6.2.F
S-35-44

Job Cyprus
Source 106-3 FIVE CRUSHER STACK
Date 5-25-74 1061 20 RD 3

J **B** **D**

R.R. / K.N.

20-11-

Pat. No. 1,722,021

$$\begin{array}{r} 23v-4 \\ \underline{28.80} \\ 10.4 \end{array}$$

078.840

211.11.

[illegible]

Bay House.
Ap

5

5.

5

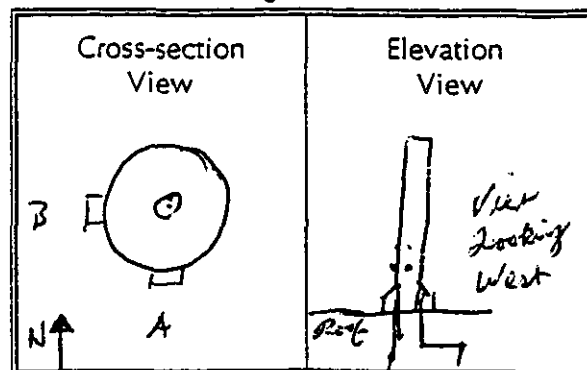
5

(612) 786-6020

EPA Method 2 Field Data Sheet

Drawing of Test Site

Job City of North Shore
Source Bin Storage Stack
Test 21 Run 0 Date 5-25-94
Stack Dimen. 34.5 IN.
Dry Bulb 76 °F Wet bulb _____ °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.92 IN.HG
Static Pressure - 0.68 IN.WC
Operators SB + DM
Pitot No. 226-5 Cn 840

[illegible]

R or nothing = reg. manometer; S = expanded; E = electronic

Time End: 0735 HRS

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Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress North Shore Date 5-25-91 Test 21 Run 1
Source Bin Storage Stack No. of traverse points 24
Method 1-5 Filter holder: 4" G. Lows Filter type: 4" G. Lows filter
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.00 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

Recovery solvent(s)

6641

☒ acetone _____
☐ other(s) _____

No. of probe wash bottles: _____
Sample recovered by: _____

1
53

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	500	496	4
Impinger No. 3			
Condenser			
Desiccant	1496	1487	9
Total			13

Integrated Gas Sampling Data:

N/A

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

123093-GASTACK\WP\METHODS\S-0046RR

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Cypress North Area Operator SB + DM Pitot No. 22V-5 Cp 870
 Sample 13 in Storage Stack Meter Box No. 18 Bar. Press. 28.92 inHg H₂O 2 X
 Date 5-25-94 1981 21 Nov 1 Gas. 10000 Nozzle No. 4-3 Nozzle Dia. .85 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inH ₂ O)	Orifice Meter (inH ₂ O)	Des. Vol. (cf)	VAC. inHg	Temperature (°F)				Gas/Dust	Oxygen (XV/V)
							Stack	Probe	Duct	Inlet		
A-12	2.5	57.85	.92	1.13	9.30	5	56	251	248	54	54	20.9
"	5	60.87	1.02	1.27	0.85	5	67			54	53	Unfilled
10	7.5	62.51	1.12	1.35	2.44	5	73	251	240	55	53	Gas
9	10	64.10	1.15	1.44	4.09	5	52			57	53	
8	12.5	65.74	1.18	1.43	5.73	5	72	254	245	58	53	
7	15	67.39	1.20	1.45	7.39	5	74			62	54	
6	17.5	69.07	1.18	1.43	9.04	5	73	251	246	64	54	
5	20	70.70	1.20	1.46	0.71	5	74			67	54	
4	22.5	72.36	1.20	1.46	2.38	5	74	250	248	67	54	
3	25	74.00	1.22	1.49	4.07	5	72			69	55	
2	27.5	75.82	1.19	1.42	5.72	5	74	251	250	70	55	
1	30	77.30	1.11	1.36	7.33	5	74			71	55	
B-12	32.5	79.04	1.20	1.47	9.01	5	74	250	251	71	56	
"	35	80.71	1.22	1.50	0.71	5	73			71	56	
10	37.5	82.42	1.22	1.50	2.40	5	73	251	254	73	56	
9	40	84.08	1.18	1.45	4.08	5	73			74	57	
8	41.5	85.96	1.15	1.45	5.96	5	74	254	256	75	57	
7	45	87.44	1.20	1.48	7.65	5	74			76	58	
6	47.5	89.15	1.19	1.42	9.31	5	74	254	251	76	58	
5	50	90.82	1.10	1.36	0.93	5	73			77	58	
4	52.5	92.55	1.12	1.38	2.57	5	74	254	251	77	59	
3	55	94.18	1.12	1.39	4.20	5	74			78	59	
2	57.5	95.83	1.18	1.40	5.89	5	74	251	250	78	60	
1	60	97.41	.90	1.19	7.41	5	74			78	60	
	(1048)											
		V _s = 39.56	ΔH = 1/42							Avg. = 62.3		
		θ = 60										

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress North Shore Date 5-25-94 Test 21 Run 2
Source Bio Storage Stack No. of traverse points 24
Method 1-5 Filter holder: 4" Glass Filter type: 4" Glass fiber
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.02 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

6639

Recovery solvent(s)

☒ Acetone _____
☐ Other(s) _____

No. of probe wash bottles:

1

Sample recovered by:

SB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	<u>504</u>	<u>502</u>	<u>2</u>
Impinger No. 3			
Condenser			
Desiccant	<u>1574</u>	<u>1500</u>	<u>14</u>
Total			<u>16</u>

Integrated Gas Sampling Data:

N/A

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

123093-GASTACKWP\METHODS\IS-0046RR

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Bayview North Shore Operators SAB + DM Pitot No. 220-5 Cp 0.80
 Sample 3-25-90 Meter Box No. 78 Air 1.85 IN MC Bar. Press. 28.92 inHg H₂O 1.5 X
 Date 5-25-90 Counter Count. 21 Run 2 Nozzle No. 4-3 Nozzle Dia 1/8 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Hood (ft/min)	Driftless Meter (ft/min)	Des. Vol. (cf)	VAD. inHg.	Temperature (°F)						Oxygen (xv/v)
							Stack	Probe	Oven	Inpy.	Coolin	Gas/Dut	
B-12	2.5	(97.30)	1.20	1.42	9.18	5	74	245	257	40	66	62	20.9
11	5	99.20	1.22	1.51	0.88	5	74				67	62	ambient
12	7.5	102.65	1.22	1.51	2.59	5	74	250	257	41	70	61	air
9	10	104.33	1.20	1.49	4.28	5	74				73	61	
8	12.5	105.99	1.15	1.43	5.95	5	74	251	254	40	75	61	
7	15	107.63	1.15	1.43	7.61	5	74				76	61	
6	17.5	109.26	1.12	1.40	9.26	5	74	250	254	40	77	62	
5	20	110.86	1.11	1.39	0.90	5	74				78	62	
4	22.5	112.50	1.18	1.48	2.60	5	74	254	258	39	78	60	
3	25	114.28	1.15	1.44	4.27	5	74				79	60	
2	27.5	115.92	1.02	1.28	5.84	5	74	254	259	38	79	60	
1	30	117.34	0.93	1.16	7.34	4	74				80	61	
A-12	32.5	118.93	1.02	1.28	8.92	5	74	254	261	38	80	61	
11	35	120.57	1.15	1.44	0.60	5	74				79	61	
10	37.5	122.22	1.12	1.40	2.25	5	74	254	260	37	80	63	
9	40	123.95	1.18	1.48	3.95	5	74				80	64	
8	42.5	125.68	1.15	1.45	5.63	5	74	251	250	38	81	62	
7	45	127.36	1.22	1.53	7.35	5	74				81	62	
6	47.5	129.08	1.22	1.53	9.08	5	74	251	250	38	81	62	
5	50	130.80	1.20	1.51	0.80	5	74				81	62	
4	52.5	132.54	1.25	1.57	2.54	5	74	251	247	38	82	65	
3	55	134.28	1.22	1.54	4.28	5	74				82	65	
2	57.5	136.00	1.20	1.51	6.00	5	74	250	246	38	82	65	
1	60	137.68	1.15	1.45	7.68	5	73				82	65	↓
	(1202)												
	θ = 60	V _s = 40.18		ΔH = 1.40								Avg. = 69.9	

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cyprus North Shore Date 5-25-94 Test 21 Run 3
Source Bea Stream Alach. No. of traverse points 24
Method 1-5 Filter holder: 4" Glass Filter type: 4" Glass Fiber
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.00 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

6642

Recovery solvent(s)

☒ Acetone _____
☐ Other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
SB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	500	497	3
Impinger No. 3			
Condenser			
Desiccant	1504	1496	8
Total			11

Integrated Gas Sampling Data: N/A

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

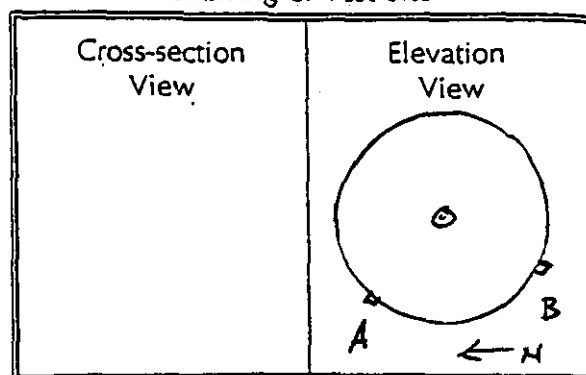
Job Copiers North Shore
 Source B.B. Smith
 Date 5-25-94 1961 21 Run 3
 Operators SB + DM
 Meter Box No. 14 MM / PA IN NC
 Cassette copy. 10000
 Pilot No. 22V.5 Cp 840
 Bar. Press. 28.5 INHg
 Nozzle No. 4-3 NDZ114 Dia. .83 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cft)	Velocity Head (in H ₂ O)	Diffuse Water (in H ₂ O)	Des. Vol. (cft)	VAC. in Hg	Temperature (°F)					Oxygen (xv/v)	
							Stack	Probe	Duct	Impy.	Gas In		Duct Out
A-12	2.5	137.80	1.10	1.37	942	5	74	251	250	39	69	66	20.9
"	5	141.05	1.18	1.46	1.10	5	74				75	65	Actual
10	7.5	142.70	1.18	1.47	2.79	5	74	251	248	38	76	65	Act
9	10	144.52	1.22	1.52	4.51	5	74				76	65	
8	12.5	146.20	1.20	1.49	6.21	5	73	254	248	38	78	65	
7	15	147.95	1.20	1.50	7.92	5	73				79	65	
6	17.5	149.74	1.22	1.52	9.65	5	73	251	248	38	79	65	
5	20	151.41	1.20	1.50	1.36	5	73				80	65	
4	22.5	153.15	1.25	1.56	3.10	5	73	251	247	38	80	65	
3	25	154.84	1.22	1.52	4.83	5	73				80	65	
2	27.5	156.56	1.20	1.50	6.54	5	73	251	247	38	81	65	
1	30	158.20	1.10	1.33	8.18	5	73				81	66	
B-12	32.5	159.92	1.21	1.51	9.90	5	73	250	247	38	81	66	
"	35	161.62	1.25	1.57	1.65	5	73				80	66	
10	37.5	163.39	1.22	1.53	3.38	5	73	250	247	38	81	66	
9	40	165.15	1.18	1.48	5.08	5	73				81	66	
8	42.5	166.83	1.15	1.44	6.76	5	73	251	247	38	81	66	
7	45	168.46	1.18	1.48	8.46	5	73				82	66	
6	47.5	170.15	1.12	1.40	0.11	5	73	251	247	38	82	66	
5	50	171.82	1.15	1.44	1.79	5	73				82	66	
4	52.5	173.49	1.10	1.44	3.47	5	73	251	246	38	82	67	
3	55	175.17	1.12	1.41	5.13	5	73				82	67	
2	57.5	176.75	1.05	1.32	6.74	5	73	250	246	38	82	67	
1	60	178.24	.91	1.14	8.24	5	72				82	67	4
(316)													
Σ = 410.44													avg = 72.6
θ = 1.0													

INTERPOLL LABORATORIES, INC.
(612) 786-6020
EPA Method 2 Field Data Sheet

Job Cyprus
Source No 2 Boiler Stack
Test 23 Run 5/27/94 Date 5/27/94
Stack Dimen. 110 IN.
Dry Bulb °F Wet bulb °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 29.40 IN.HG
Static Pressure -.97 IN.WC
Operators D. Van Hoever + D. Marso
Pitot No. V27-10 C_p .84

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: <u>15</u> IN.	Time Start: <u> </u> HRS		
A 1	.021	2.31	17.31		
2	.067	7.37	22.37		
3	.118	12.98	27.98		
4	.177	19.47	34.47		
5	.25	27.5	42.5		
6	.356	39.16	54.16		
7	.644	70.84	85.84		
8	.75	82.5	97.5		
9	.823	90.53	105.53		
10	.882	97.02	112.02		
11	.933	102.63	117.63		
12	.979	107.69	122.69		
B 1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Temp. Meas. Device & S/N:				Time End: <u> </u> HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cyprus Date 5/27/94 Test 23 Run 1
Source No 2 Boiler Stack No. of traverse points 24
Method 5 Filter holder: glass Filter type: glass fiber
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

Recovery solvent(s)

6542

☒ acetone
☐ other(s)

No. of probe wash bottles:

Sample recovered by:

1
Dirt

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	282	200	82
Impinger No. 3			
Condenser			
Desiccant	1449	1430	19
Total			101

Integrated Gas Sampling Data: -Trailer on site!

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

Cyprus

41005 41006 41007 41008 41009 41010 41011 41012 41013 41014 41015 41016 41017 41018 41019 41020 41021 41022 41023 41024 41025 41026 41027 41028 41029 41030 41031 41032 41033 41034 41035 41036 41037 41038 41039 41040 41041 41042 41043 41044 41045 41046 41047 41048 41049 41050 41051 41052 41053 41054 41055 41056 41057 41058 41059 41060 41061 41062 41063 41064 41065 41066 41067 41068 41069 41070 41071 41072 41073 41074 41075 41076 41077 41078 41079 41080 41081 41082 41083 41084 41085 41086 41087 41088 41089 41090 41091 41092 41093 41094 41095 41096 41097 41098 41099 41100 41101 41102 41103 41104 41105 41106 41107 41108 41109 41110 41111 41112 41113 41114 41115 41116 41117 41118 41119 41120 41121 41122 41123 41124 41125 41126 41127 41128 41129 41130 41131 41132 41133 41134 41135 41136 41137 41138 41139 41140 41141 41142 41143 41144 41145 41146 41147 41148 41149 41150 41151 41152 41153 41154 41155 41156 41157 41158 41159 41160 41161 41162 41163 41164 41165 41166 41167 41168 41169 41170 41171 41172 41173 41174 41175 41176 41177 41178 41179 41180 41181 41182 41183 41184 41185 41186 41187 41188 41189 41190 41191 41192 41193 41194 41195 41196 41197 41198 41199 41200 41201 41202 41203 41204 41205 41206 41207 41208 41209 41210 41211 41212 41213 41214 41215 41216 41217 41218 41219 41220 41221 41222 41223 41224 41225 41226 41227 41228 41229 41230 41231 41232 41233 41234 41235 41236 41237 41238 41239 41240 41241 41242 41243 41244 41245 41246 41247 41248 41249 41250 41251 41252 41253 41254 41255 41256 41257 41258 41259 41260 41261 41262 41263 41264 41265 41266 41267 41268 41269 41270 41271 41272 41273 41274 41275 41276 41277 41278 41279 41280 41281 41282 41283 41284 41285 41286 41287 41288 41289 41290 41291 41292 41293 41294 41295 41296 41297 41298 41299 41300 41301 41302 41303 41304 41305 41306 41307 41308 41309 41310 41311 41312 41313 41314 41315 41316 41317 41318 41319 41320 41321 41322 41323 41324 41325 41326 41327 41328 41329 41330 41331 41332 41333 41334 41335 41336 41337 41338 41339 41340 41341 41342 41343 41344 41345 41346 41347 41348 41349 41350 41351 41352 41353 41354 41355 41356 41357 41358 41359 41360 41361 41362 41363 41364 41365 41366 41367 41368 41369 41370 41371 41372 41373 41374 41375 41376 41377 41378 41379 41380 41381 41382 41383 41384 41385 41386 41387 41388 41389 41390 41391 41392 41393 41394 41395 41396 41397 41398 41399 41400 41401 41402 41403 41404 41405 41406 41407 41408 41409 41410 41411 41412 41413 41414 41415 41416 41417 41418 41419 41420 41421 41422 41423 41424 41425 41426 41427 41428 41429 41430 41431 41432 41433 41434 41435 41436 41437 41438 41439 41440 41441 41442 41443 41444 41445 41446 41447 41448 41449 41450 41451 41452 41453 41454 41455 41456 41457 41458 41459 41460 41461 41462 41463 41464 41465 41466 41467 41468 41469 41470 41471 41472 41473 41474 41475 41476 41477 41478 41479 41480 41481 41482 41483 41484 41485 41486 41487 41488 41489 41490 41491 41492 41493 41494 41495 41496 41497 41498 41499 41500 41501 41502 41503 41504 41505 41506 41507 41508 41509 41510 41511 41512 41513 41514 41515 41516 41517 41518 41519 41520 41521 41522 41523 41524 41525 41526 41527 41528 41529 41530 41531 41532 41533 41534 41535 41536 41537 41538 41539 41540 41541 41542 41543 41544 41545 41546 41547 41548 41549 41550 41551 41552 41553 41554 41555 41556 41557 41558 41559 41560 41561 41562 41563 41564 41565 41566 41567 41568 41569 41570 41571 41572 41573 41574 41575 41576 41577 41578 41579 41580 41581 41582 41583 41584 41585 41586 41587 41588 41589 41590 41591 41592 41593 41594 41595 41596 41597 41598 41599 41600 41601 41602 41603 41604 41605 41606 41607 41608 41609 41610 41611 41612 41613 41614 41615 41616 41617 41618 41619 41620 41621 41622 41623 41624 41625 41626 41627 41628 41629 41630 41631 41632 41633 41634 41635 41636 41637 41638 41639 41640 41641 41642 41643 41644 41645 41646 41647 41648 41649 41650 41651 41652 41653 41654 41655 41656 41657 41658 41659 41660 41661 41662 41663 41664 41665 41666 41667 41668 41669 41670 41671 41672 41673 41674 41675 41676 41677 41678 41679 41680 41681 41682 41683 41684 41685 41686 41

Operator Box No. 8 DiA & DM
 Operator Count. 1.00

81.0
1.85 587
20 11 587

11 412204
11 412204
11 412204

$\frac{100}{100} = 100\%$
 $\frac{100}{100} = 100\%$
 $\frac{100}{100} = 100\%$

8-17-11.

Traverse Point No.	Sampling Time (min)	Sample Volume (cfs)	Velocity Head (ft)	Drifted Meter (ft)	Dep. Vol. (cfs)	VAC. in Hg	Temperature (°F)					Gas/Dst	Oxygen (Kv/v)
							Stack	Prob	Duct	Inpy.	Gas/In		
A 12	0803	796.1	.85	2.17	8.12	8	280	251	246	53	52	52	0.0.5
11	2.5	798.15	.77	1.82	9.95	7	280				57	54	
10	5	800.96	.82	1.96	1.85	7	274				59	55	
9	7.5	801.87	.82	1.97	3.77	7	274	256	255	53	61	56	
8	10	803.74	.89	2.14	5.76	7	274				62	57	
7	12.5	805.70	.92	2.21	7.79	7	275				63	57	
6	15	807.66	.88	2.12	9.78	7	275	254	251	53	64	58	
5	17.5	809.70	.85	2.05	1.74	7	277				66	59	
4	20	811.62	.88	2.13	3.74	7	275				66	60	
3	22.5	813.70	.84	2.03	5.69	7	279	255	253	52	66	60	
2	25	815.63	.90	2.17	7.64	7	279				67	60	
1	27.5	817.64	.92	2.22	9.66	7	278				67	60	
B 12	30	819.64	.92	2.24	1.71	8	278	254	251	53	63	60	
11	32.5	823.78	.93	2.24	3.74	8	280				64	60	
10	35	825.92	.96	2.31	5.79	8	279				65	60	
9	37.5	827.94	.96	2.31	7.86	8	281	256	253	54	66	61	
8	40	830.00	.94	2.26	9.95	8	280				67	61	
7	42.5	832.10	.88	2.36	2.01	8	282				68	62	
6	45	834.14	.88	2.36	4.12	8	283	257	253	54	68	63	
5	47.5	836.16	.89	2.12	6.12	8	284				68	63	
4	50	838.12	.90	2.16	8.13	8	284				69	63	
3	52.5	840.16	.84	2.02	0.15	8	286	254	251	55	70	64	
2	55	842.11	.84	2.02	2.10	8	286				70	64	
1	57.5	844.02	.80	1.93	4.01	8	286				70	64	
60													
0908													
Avg. = 57.8													

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cyprus
Source No 2 Boiler Stack
Method 5 Filter holder: glass
Sample Train Leak Check:

Date 5/27/94 Test 27 Run 2
No. of traverse points 24
Filter type: glass fiber

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

6631

Recovery solvent(s)

☒ Acetone _____
☐ Other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
Duit

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	<u>282</u>	<u>200</u>	<u>82</u>
Impinger No. 3			
Condenser			
Desiccant	<u>1498</u>	<u>1481</u>	<u>17</u>
Total			<u>99</u>

Integrated Gas Sampling Data: Trailer on site

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Cypress Date 5/27/84 Source No. 2 Baker Stack Operator DM # DM Pilot No. 127-10 CP 54
 Date 5/27/84 Source No. 2 Baker Stack Water Box No. 2 Bar. Press. 29.90 IN HG 120.9 X
 Gas. No. 10-2 Nozzle No. 10-2 IN. 11

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (in H ₂ O)	Duct Gas Temp (in H ₂ O)	YAC (in H ₂ O)	Temperatures (°F)						Oxygen (xv/v)	
						Stack	Probe	Duct	Inlet	Gas/Out			
B 12	0938	844.4	.93	2.16	6.40	8	289	251	246	47	62	62	0.05
11	2.5	846.40	.9	2.10	8.38	8	290				66	64	
10	5	848.37	.94	2.21	0.43	8	287				68	64	
9	7.5	850.50	.95	2.23	2.48	8	291	254	251	47	68	64	
8	10	852.51	.99	2.34	4.58	8	284				69	65	
7	12.5	854.53	.99	2.35	6.70	8	284				69	65	
6	15	856.65	1.0	2.37	8.80	8	284	256	253	48	70	65	
5	17.5	858.86	.92	2.19	0.84	8	283				71	66	
4	20	860.75	.94	2.23	2.89	8	284				72	66	
3	22.5	862.84	.92	2.18	4.93	8	287	251	254	50	73	67	
2	25	864.89	.92	2.18	6.97	8	287				73	67	
1	27.5	866.98	.84	2.0	8.92	7.5	287				74	67	
A 12	30	868.99	.84	1.57	0.65	5	287	254	256	51	71	67	
11	32.5	870.70	.66	1.47	2.32	5	286				73	68	
10	35	872.32	.62	1.55	4.04	5	285				74	68	
9	37.5	874.06	.65	1.63	5.80	5	284	255	254	52	75	69	
8	40	875.80	.68	1.67	7.59	5	284				76	69	
7	42.5	877.56	.70	1.67	9.38	5	285				76	69	
6	45	879.29	.70	1.92	1.30	6	284	256	254	52	77	70	
5	47.5	881.30	.80	1.92	3.39	8	285				77	70	
4	50	883.35	.95	2.28	5.48	8	285				77	70	
3	52.5	885.43	.96	2.30	7.54	8	285				77	70	
2	55	887.46	.93	2.22	9.60	8	287	257	253	52	77	70	
1	57.5	889.53	.93	2.22	1.59	8	289				77	70	
1	60	891.59	.86	2.05	1.59	8	289				77	70	
(1044)		V _m = 45.19									Av _g = 69.8		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cyprus Date 5/27/94 Test 27 Run 3
Source No 2 Boiler Stack No. of traverse points 24
Method 5 Filter holder: glass Filter type: glass fiber
Sample Train Leak Check: _____

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

6535

Recovery solvent(s)

☒ Acetone _____
☐ other(s) _____

No. of probe wash bottles:

Sample recovered by:

Dust

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	301	200	101
Impinger No. 3			
Condenser			
Desiccant	1458	1449	9
Total			110

Integrated Gas Sampling Data: Trailer

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

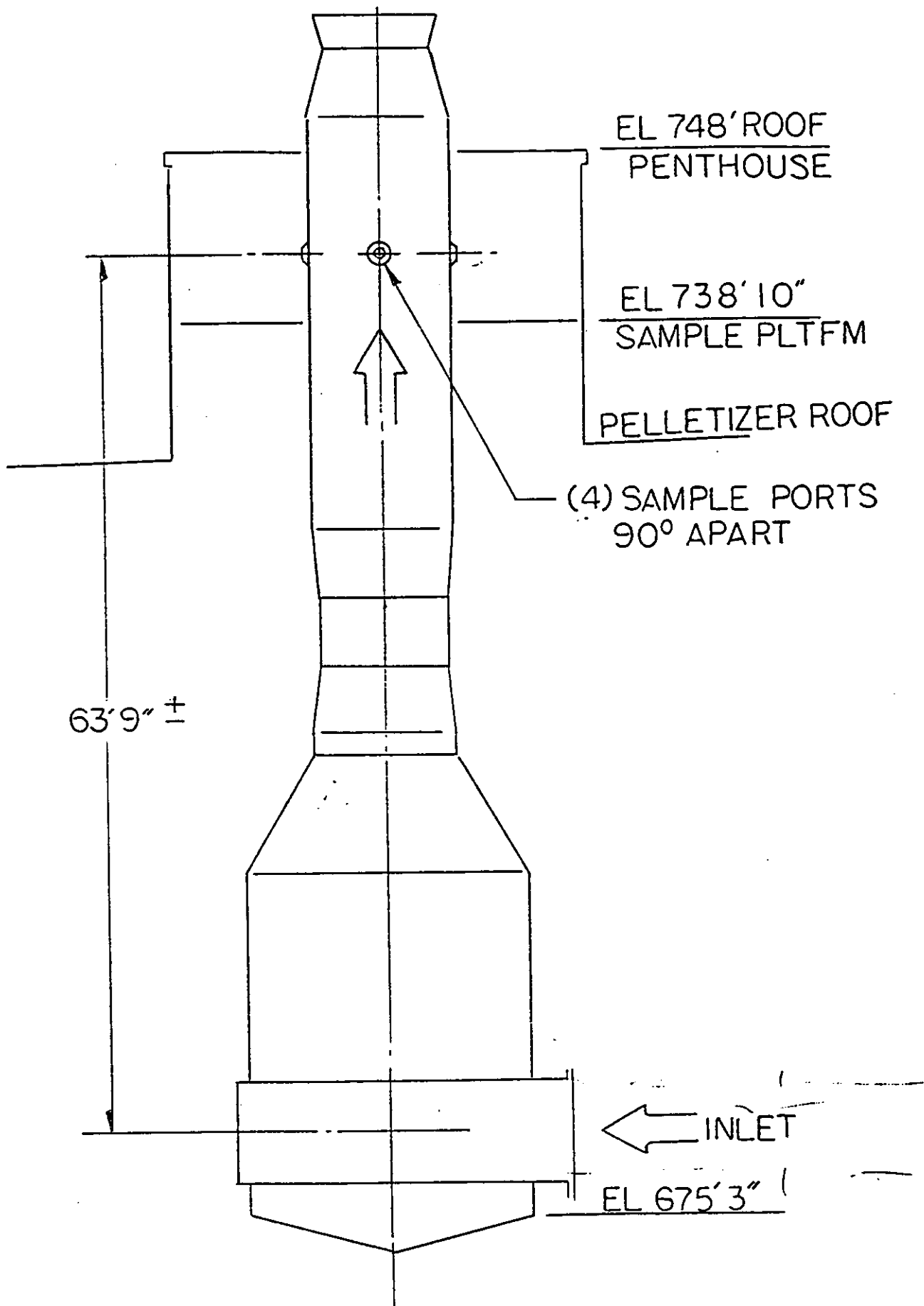
Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

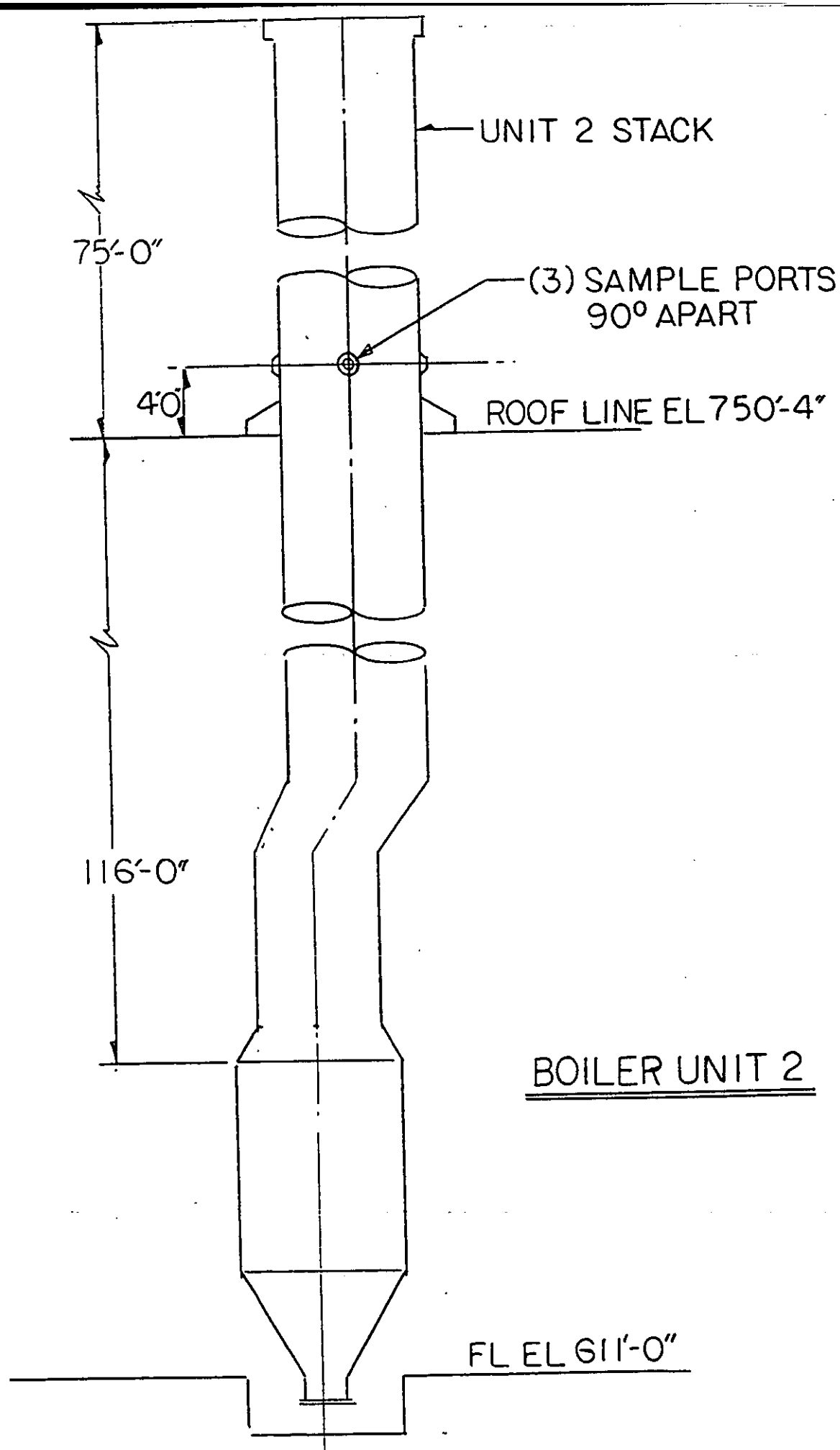
INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job CYRUS Operators DUN T JIM Pilot No. V27-10 Cp .84
 Source NO 2 BELLER STACK Meter Box No. 8 Air 1.85 IN MC Bar. Press. 29.50 inHg H₂O 9
 Date 5/27/94 Gasifier eff. 1.0078 Nozzle No. 10-52 Nozzle Dia. .247 IN.

Transfer Point No.	Sampling Time (min)	Sample Volume (cft)	Velocity Head (inHG)	Drifts Meter (inHG)	Dis. Vol. (cft)	VAC. inHG	Temperatures (°F)						Oxygen (Kv/v)
							Stack	Probe	Dryb	Impg.	Gas/in	Gas/Dvt	
A 12	1115	892.04			3.77	5	281	246	251	50	69	69	0.0.5
11	2.5	893.73	.66	1.58	5.49	5	285				70	71	
10	5	895.46	.65	1.69	7.28	6	285				73	70	
9	7.5	897.35	.71	1.74	9.11	6	286		251	50	74	71	
8	10	899.01	.73	1.86	1.00	6	286				76	72	
7	12.5	900.95	.78	1.99	2.95	6	287				76	72	
6	15	902.94	.83	2.27	5.03	8	287	253	254	51	77	72	
5	17.5	905.00	.95	2.39	7.18	8	287				77	73	
4	20	907.10	1.0	2.27	9.27	8	288				77	73	
3	22.5	909.34	.95	2.25	1.35	8	287	254	254	51	77	73	
2	25	911.42	.94	2.11	3.36	8	287				78	73	
1	27.5	913.43	.88	1.99	5.32	7	287				78	73	
	30	915.40	.83	2.40	7.46	8	287	256	253	50	77	74	
B 12	32.5	917.53	1.0	2.52	9.66	8	285				79	74	
11	35	919.70	1.05	2.53	1.87	8	286				80	75	
10	37.5	921.86	1.05	2.18	3.92	8	284	257	256	51	80	75	
9	40	923.93	.90	2.03	5.90	8	284				80	75	
8	42.5	925.93	.84	2.35	8.02	8	283				80	75	
7	45	928.02	.97	2.39	0.17	8	284	256	255	51	81	75	
6	47.5	930.18	.99	2.23	2.25	8	283				81	76	
5	50	932.25	.92	2.30	4.36	8	284				81	76	
4	52.5	934.39	.95	2.18	6.41	8	284	254	255	52	80	76	
3	55	936.40	.90	2.03	8.39	8	284				80	76	
2	57.5	938.36	.84	1.94	0.32		284				80	76	
1	60	940.32	.80				284				80	76	
	C 1218												
		V ₀ = 48.28		ΔH = 2.12								Av _g = 75.5	
		θ = 60											



WASTE GAS PRECIPITROL

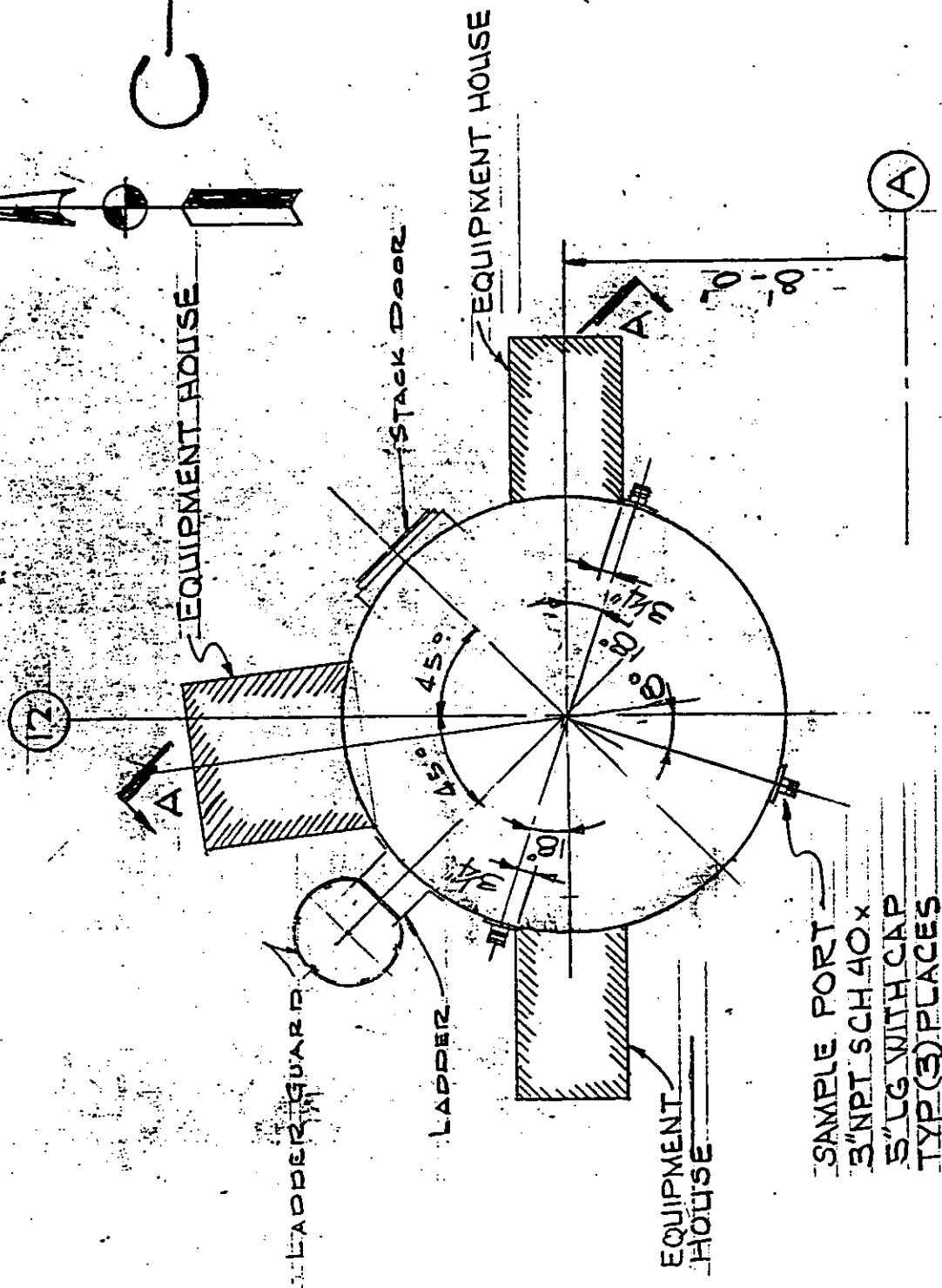


DETAIL B

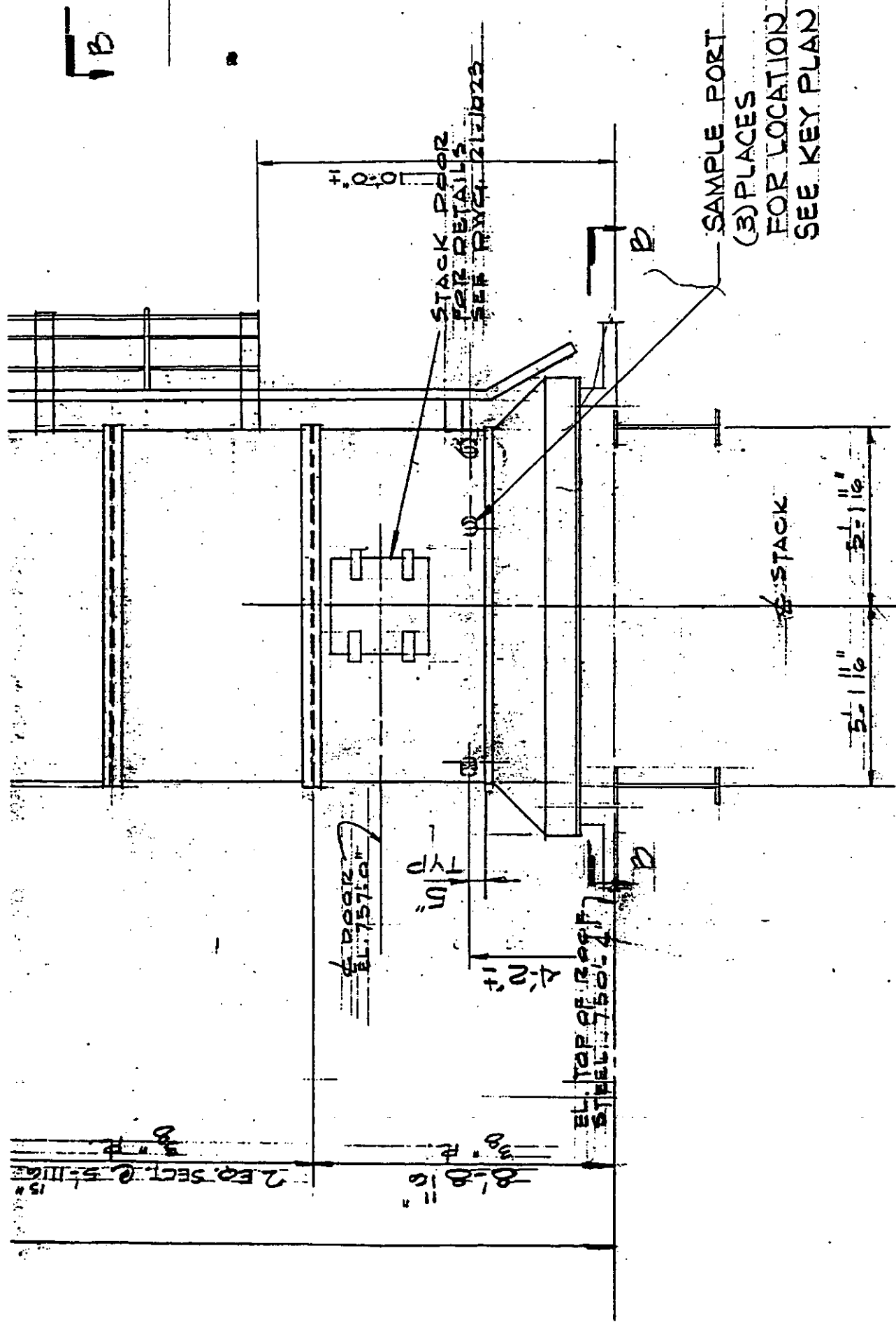
SCALE 3" = 1'-0"

PLANT NORTH

YPICAL)
ASHER (TYP.)



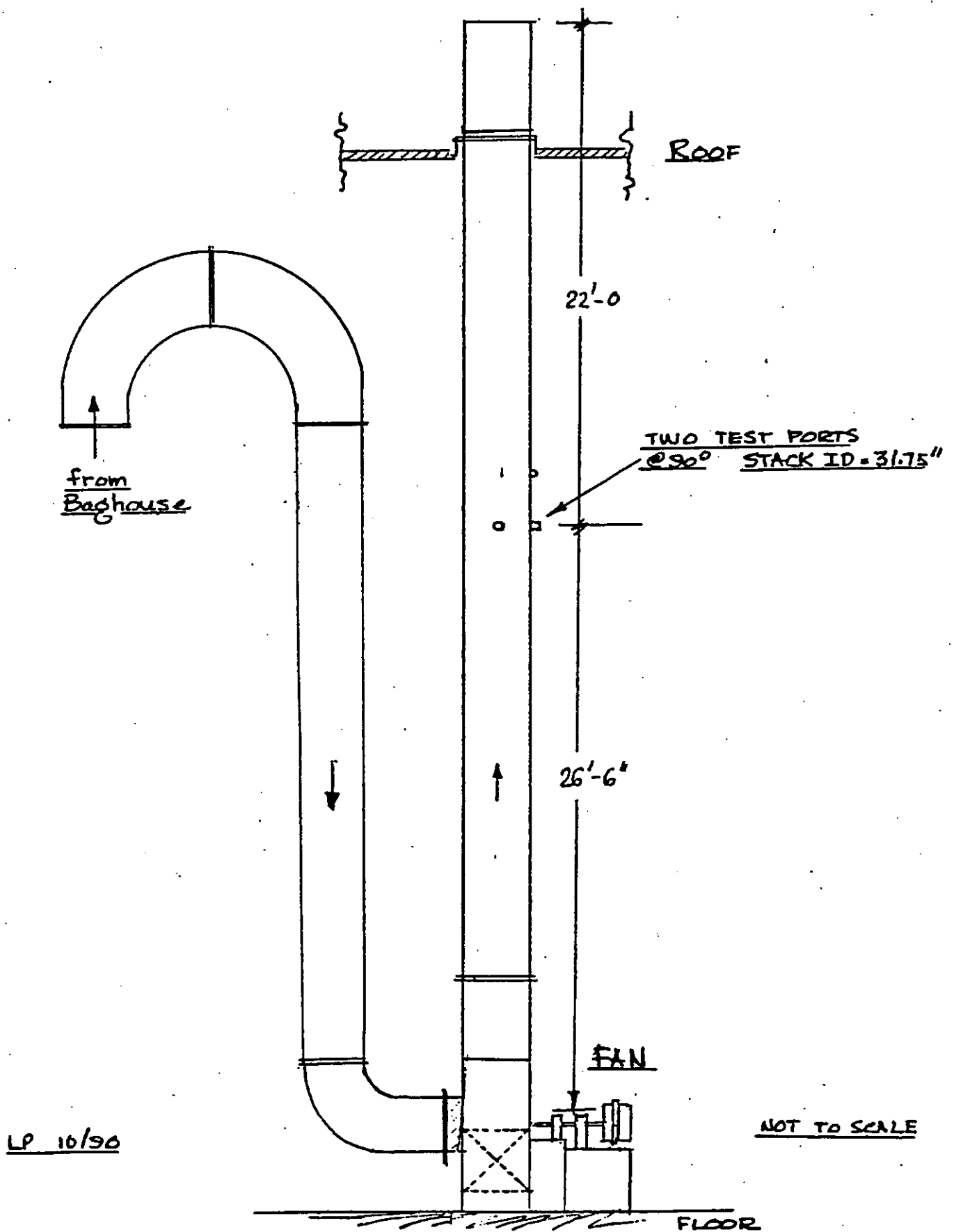
KEY PLAN



ELEVATION A-A

LOOKING SOUTHWEST - SEE KEY PLAN
SCALE 1/4" = 1'-0"

CYPRUS NORTHSORE
NO 2 FINE CRUSHER STACK



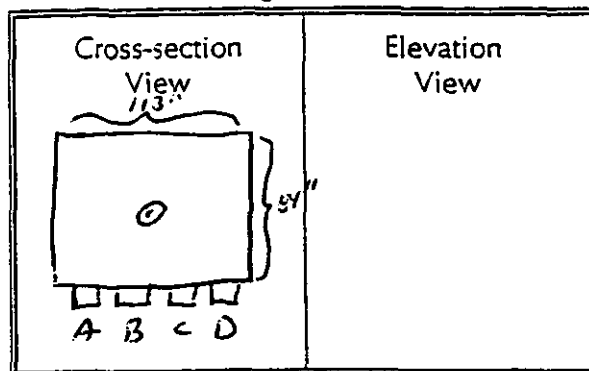
APPENDIX C

FIELD DATA SHEETS

INTERPOLL LABORATORIES, INC.
(612) 786-6020
EPA Method 2 Field Data Sheet

Drawing of Test Site

Job Cyprus / North Shore, n.v.
Source Hood Exhaust / Inlet
Test 1 Run Date 5-24-94
Stack Dimen. 84 x 113 IN.
Dry Bulb 205 °F Wet bulb 124 °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 29.18 IN.HG
Static Pressure +1.55 IN.WC
Operators Michaelson & E. J. J. J.
Pitot No. 27V-8 C, 194



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: <u>17.0</u> IN.	Time Start: <u>0912</u> HRS		
A-1		7.00	24.00	1.00	
2		21.00	38.00	1.07	
3		35.00	52.00	1.20	
4		49.00	66.00	1.43	
5		63.00	80.00	1.64	
6		77.00	94.00	1.50	
B-1				2.10	
2				2.07	
3				1.97	
4				1.83	↑
5				1.85	
6				1.90	205
C-1				1.20	↓
2				1.93	
3				1.75	
4				1.80	
5				1.88	
6				1.91	
D-1				1.69	
2				1.73	
3				1.85	
4				1.90	
5				1.94	
6				1.90	
Temp. Meas. Device & S/N: <u>PDT-28 / TC</u>				Time End: <u>0918</u> HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress / North Shore, MN Date 5-24-94 Test 1 Run 1
Source Hood Exhaust / Inlet No. of traverse points 24
Method 17 Filter holder: S.S. Filter type: S.S. Thimble
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.02 cfm at 6 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

23

Recovery solvent(s)

☒ Acetone
☐ other(s)

No. of probe wash bottles:

Sample recovered by:

1
M. Kachler + E. Jvers

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser	52	0	52
Desiccant	1528	1503	25
Total			77

Integrated Gas Sampling Data:

Trachler

Bag Pump No. 27B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 0955
Sampling rate: 400

Box No. 19 Bag No. 1
Size: 44 L
cc/min at 20 in. Hg.
(HRS) Time end: 1106 (HRS)
cc/min Operator: M. Kachler

S/N of O₂ Analyzer used to monitor train outlet:

5

Not Cypripedium / North Shorey - 20
Succulent / Haul Exhaust / Inlet
Inlet 5-24-94 1061 / Nov 1

Operator M. Kaehler + E. Ver.
Water Box No. 211 1.95 IN NE
Computer Count 16 997

Pitot No. 27V-9 Cp .94
Bar. Press. 29.18 in Hg H2O 12 x
Nozzle No. 5-3 Nozzle Dia. .190 in.

[illegible]

23

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress / North Shore m.w. Date 5-24-94 Test 1 Run 2
Source Hood Exhaust / Inlet No. of traverse points 24
Method 17 Filter holder: S.S. Filter type: S.S. Thimble
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.02 cfm at 0 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

23

Recovery solvent(s)

☒ Acetone _____
☐ other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
M. Kachler + E. Tvers

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		~~0~~	
Impinger No. 2			
Impinger No. 3			
Condenser	<u>70</u>	<u>0</u>	<u>70</u>
Desiccant	<u>1410</u>	<u>1384</u>	<u>26</u>
Total			<u>96</u>

Integrated Gas Sampling Data:

Trailer

Bag Pump No. 27 B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 1145
Sampling rate: 400

Box No. 19 Bag No. 2
Size: 44 L
cc/min at 20 in. Hg.
(HRS) Time end: 1247 (HRS)
cc/min Operator: M. Kachler

S/N of O₂ Analyzer used to monitor train outlet:

5

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Cypress / 160-16 Shore, New Operator Mr. Kuehl Pitot No. 270-8 Cp 84
 Source Exhaust / Gate Meter Box No. 16 Bar. Press. 29.78 inHg H₂O 5.7 x
 Date 5-24-94 Gasometer count. 9977 Nozzle No. 5-3 Nozzle Dia. 1/8 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inH ₂ O)	Drifts Meter (inH ₂ O)	Dep. Vol. (cf)	VAC. inHg	Temperatures (°F)					Oxygen (xv/v)
							Stack	Probe	Duct	Gas In	Gas/Duct	
D-6	11.45	456.10	1.05	1.15	7.56	3	204	243	250	70	69	20.3
5	2.5	457.56	1.15	1.26	9.09	3	203	247	252	72	69	20.4
4	2.5	460.61	1.12	1.23	0.60	3	203	250	255	75	69	20.4
3	10	462.13	1.20	1.31	2.17	3	205	253	253	77	69	20.4
2	12.5	463.78	1.38	1.52	3.86	4	204	250	254	79	69	20.4
1	15	465.66	1.60	1.76	5.67	4	204	252	257	80	69	20.4
C-6	17.5	467.61	1.90	2.09	7.65	5	204	247	255	82	69	20.4
5	20	469.60	1.93	2.13	9.65	5	203	251	250	82	69	20.5
4	22.5	471.63	1.91	2.10	1.64	5	204	253	248	83	70	20.4
3	25	473.54	1.85	2.05	3.60	5	204	255	249	84	70	20.4
2	27.5	475.59	2.00	2.21	5.64	5.5	204	255	253	84	70	20.5
1	30	477.60	2.00	2.21	7.68	5.5	204	254	257	84	70	20.6
B-6	32.5	479.20	2.07	2.29	9.25	6	205	250	255	85	71	20.5
5	35	481.25	1.99	2.20	1.79	6	205	250	252	85	71	20.6
4	37.5	483.22	1.92	2.13	3.79	5.5	203	252	249	85	71	20.6
3	40	485.67	1.81	2.01	5.74	5	204	253	245	86	71	20.6
2	42.5	487.57	1.68	1.87	7.62	5	203	250	249	86	72	20.7
1	45	489.61	1.93	2.20	9.66	6	203	251	253	86	72	20.7
A-6	47.5	491.20	2.05	2.28	1.73	6	204	250	255	86	72	20.7
5	50	493.67	1.90	2.11	3.73	5.5	204	246	259	87	73	20.7
4	52.5	495.68	1.92	2.13	5.74	5.5	205	248	259	87	73	20.7
3	55	497.65	1.87	2.08	7.72	5.5	205	250	256	87	73	20.7
2	57.5	499.61	1.80	2.00	9.67	5.5	204	247	256	87	73	20.7
1	60	501.54	1.72	1.92	1.57	5	203	249	257	87	73	20.7
(12.47)												
V _m = 45.34										Av _g = 76.6		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress / North Shore drive Date 5-24-94 Test 1 Run 3
Source Hot Exhaust / Inlet No. of traverse points 24
Method 17 Filter holder: S.S. Filter type: S.S. Thimble
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.01 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

Recovery solvent(s)

29

☒ Acetone
☐ other(s)

No. of probe wash bottles:

1
Mr. Kuchler + E. Jones

Sample recovered by:

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser	<u>66</u>	<u>0</u>	<u>66</u>
Desiccant	<u>1549</u>	<u>1529</u>	<u>20</u>
Total			<u>86</u>

Integrated Gas Sampling Data:

Trader

Bag Pump No. 27B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 1325
Sampling rate: 400

Box No. 19 Bag No. 3
Size: 44 L
cc/min at 20 in. Hg.
(HRS) Time end: 1453 (HRS)
cc/min Operator: Mr. Kuchler

S/N of O₂ Analyzer used to monitor train outlet:

5

Job	Copper / Alu - the Sages - 2000
500000	Offical Exchange / July 1st
Date	5-24-94 1000 3

Operator
Meter Box No. 495
Compressor Count. 16 997

Pilot No. 27V-2 CP 104
 Rec. Press. 24.18 H2O 3.4 x
 NOZZLE NO. 1-3 NOZZLE DIA. 1.92 IN.

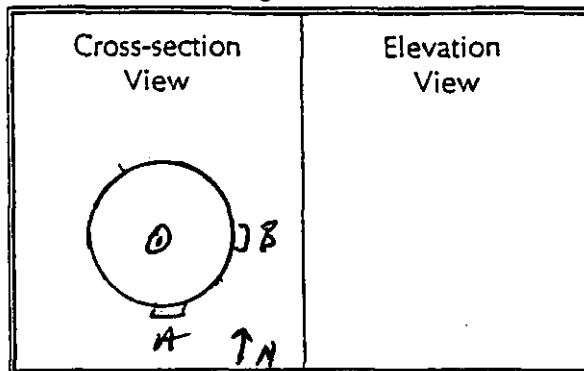
Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Driftless Water (inWC)	Dep. Vol. (cf)	VAC. inHg	Temperatures (°F)					Oxygen (xv/v)
							Stack	Probe	Duct	Inlet	Cue/Dut	
(1325)												
A-6	2.5	502.20	1.05	1.09	8.63	3	204	243	253	72	72	20.4
S	5	505.05	1.01	1.04	5.02	3	205	247	258	72	72	20.4
4	7.5	506.48	1.03	1.06	6.43	3	205	250	261	72	72	20.4
3	10	508.11	1.37	1.41	8.06	3.5	207	252	263	72	72	20.4
2	12.5	509.80	1.55	1.60	9.79	4	207	253	260	72	72	20.4
1	15	511.60	1.72	1.78	16.2	4	205	253	258	71	71	20.4
B-6	17.5	513.53	1.84	1.90	3.52	5	205	255	255	72	72	20.5
S	20	515.31	1.78	1.85	5.38	5	204	256	250	72	72	20.5
4	22.5	517.20	1.80	1.85	3.25	5	209	257	248	72	72	20.5
3	25	519.14	1.87	1.93	9.16	5	209	257	245	72	71	20.3
2	27.5	521.02	1.88	1.92	1.05	5	208	254	251	74	71	20.4
1	30	522.92	1.91	1.96	2.96	5.5	207	251	253	77	71	20.5
C-6	32.5	524.76	1.85	1.90	4.85	5	207	247	255	78	71	20.4
S	35	526.67	1.80	1.86	6.71	5	204	248	255	90	71	20.5
4	37.5	528.55	1.79	1.85	9.58	5	204	251	252	91	71	20.5
3	40	530.41	1.67	1.73	8.48	6	207	248	253	92	71	20.6
2	42.5	532.30	1.84	1.90	3.37	6	206	250	250	93	71	20.6
1	45	534.14	1.68	1.74	4.19	6	205	247	255	94	71	20.6
D-6	47.5	536.05	1.86	1.93	6.09	6	205	249	258	93	71	20.6
S	50	537.92	1.81	1.88	7.97	6	204	249	253	94	71	20.7
4	52.5	539.80	1.75	1.82	9.92	6	204	245	256	95	72	20.7
3	55	541.67	1.82	1.89	1.71	6	205	246	252	95	72	20.8
2	57.5	543.53	1.70	1.77	3.54	6	205	248	250	95	72	20.8
1	60	545.48	1.68	1.75	5.36	6	204	249	248	96	72	20.7
(1453)												
Avg. = 76.0							Avg. = 76.0					

S-0037R

INTERPOLL LABORATORIES, INC.
(612) 786-6020
EPA Method 2 Field Data Sheet

Drawing of Test Site

Job CYPRUS
Source NO12 Hood Vent Stack
Test N Run 5-24-84
Stack Dimen. 70 IN.
Dry Bulb °F Wet bulb °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 29.18 IN.HG
Static Pressure - .38 IN.WC
Operators E. TROWBRIDGE - D. VALIE
Pitot No. 25V-6 C, 84



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: <u>2</u> IN.	Time Start: <u>0900</u> HRS		
A 1	.021	1.47	3.47	.48	
2	.067	4.69	6.69	.50	
3	.118	8.26	10.26	.60	128
4	.177	12.39	14.39	.64	
5	.250	17.50	19.50	.68	
6	.356	24.92	26.92	.70	
7	.644	45.00	47.00	.72	
8	.750	52.50	54.50	.72	128
9	.823	57.61	59.61	.70	
10	.882	61.74	63.74	.70	
11	.933	65.31	67.31	.67	
12	.979	68.53	70.53	.62	
B 1				.52	
2				.58	
3				.62	
4				.20	129
5				.72	
6				.72	
7				.20	
8				.70	
9				.68	129
10				.68	
11				.65	
12				.60	
Temp. Meas. Device & S/N: <u>POT-34</u>				Time End: <u>0922</u> HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CYPRUS Date 5-21-94 Test 2 Run 1
Source NO 12 HAND VINT STICK No. of traverse points 24
Method 5 Filter holder: 4" GLASS Filter type: 4" Glass Fiber
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 7 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

6545

Recovery solvent(s)

☒ Acetone _____
☐ Other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		<u>100</u>	
Impinger No. 2	<u>290</u>	<u>100</u>	<u>90</u>
Impinger No. 3		<u>0</u>	
Condenser			
Desiccant	<u>1460</u>	<u>1438</u>	<u>22</u>
Total			<u>112</u>

Integrated Gas Sampling Data:

Bag Pump No. 23B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 0956
Sampling rate: 400

Box No. 15 Bag No. 1
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 1058 (HRS)
cc/min Operator: ET

S/N of O₂ Analyzer used to monitor train outlet:

4

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Cyflus Operator LT-DV Pilot No. 234-6 Cy 1840
 Source N112 Had Part Stack Meter Box No. 19 183 IN HC Bar. Press. 23.78 IN HG H2O
 Date 5-24-84 Computer Code 1051 2 Run 1 Nozzle No. 8-2 Nozzle Dia. 248 IN.

Transfer Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inHC)	Orifice Meter (inHC)	Des. Vol. (cf)	VAC. inHg	Temperature (°F)					Dwyer (xv/v)
							Stack	Probe	Duct	Gas In	Gas Out	
A 12	19.55	479.50	.48	1.32	1.12	4.0	135	260	248	61	60	19.5
11	5	481.12	.52	1.41	2.79	4.0	135			63	60	19.6
10	7.5	484.59	.60	1.63	4.58	5.0	136	262	250	67	60	19.7
9	10	486.40	.63	1.71	6.42	5.0	136			69	60	19.7
8	12.5	488.30	.68	1.86	8.33	6.0	135	245	258	71	61	19.7
7	15	490.20	.70	1.92	10.29	6.0	132			71	61	18.5
6	17.5	492.20	.72	1.98	12.27	6.0	132	267	262	73	61	17.0
5	20	494.21	.72	1.98	14.26	6.0	132			74	61	18.5
4	22.5	496.18	.70	1.93	16.23	6.0	132	245	260	75	62	18.0
3	25	498.10	.70	1.93	18.18	6.0	134			75	63	19.0
2	27.5	500.02	.67	1.85	20.10	4.0	153	268	264	77	63	19.4
1	30	501.90	.62	1.72	21.95	6.0	153			77	63	18.7
B 12	32.5	503.47	.52	1.44	23.85	5.0	152	265	267	77	63	19.7
11	35	505.50	.58	1.88	25.59	5.0	133	2		75	65	19.0
10	37.5	507.44	.68	1.88	27.53	5.5	134	262	245	74	65	18.6
9	40	509.40	.70	1.95	29.50	6.0	129			75	65	18.0
8	42.5	511.42	.72	2.00	31.50	6.0	129	245	262	76	65	19.5
7	45	513.41	.72	2.01	33.51	6.0	127			76	65	18.8
6	47.5	515.40	.70	1.96	35.49	6.0	127	262	260	77	64	18.2
5	50	517.38	.70	1.96	37.47	6.0	127			78	66	17.8
4	52.5	519.35	.69	1.93	39.44	6.0	129	260	263	78	67	17.2
3	55	521.32	.68	1.91	41.40	6.0	128			79	67	17.5
2	57.5	523.35	.65	1.82	43.38	6.0	128	258	260	79	67	19.0
1	60	525.20	.62	1.74	45.35	6.0	128			79	67	19.4
	10.59											
	Q = 60	V = 45.70		ΔH = 182						AVG. = 68.7		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CYPRUS Date 5-24-94 Test 2 Run 2
Source NO 12 HOOD VENT STACK No. of traverse points 24
Method ✓ Filter holder: 4" GLASS Filter type: 4" Glass Fiber
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ✓
Post test: 0 cfm at 7 in. Hg. (vac) ✓

Particulate Catch Data:

No. of filters used:

Recovery solvent(s)

6567

☒ Acetone _____
☐ Other(s) _____

No. of probe wash bottles:

1

Sample recovered by:

ST

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		<u>100</u>	
Impinger No. 2	<u>309</u>	<u>100</u>	<u>109</u>
Impinger No. 3		<u>0</u>	
Condenser			
Desiccant	<u>1475</u>	<u>1460</u>	<u>15</u>
Total			<u>124</u>

Integrated Gas Sampling Data:

Bag Pump No. 238
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 1146
Sampling rate: 440

Box No. 15 Bag No. 2
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 1249 (HRS)
cc/min Operator: ST

S/N of O₂ Analyzer used to monitor train outlet: 4

Job	24885			
Supervisor	11012	Frank Pearl	5/24/44	1941
Date	5-24-44		2	1941
Operator	ET-DV			
Motor Box No.	113	IN QC		
Counter Serial	19825			
Pilot No.	231-6			184
Bar. Pressure	23.18			10114
Nozzle No.	24			10114
				248
				114

[illegible]

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CYPRUS Date 5-24-84 Test 2 Run 3
Source No 12 Hawk Vent Stack No. of traverse points 24
Method 5 Filter holder: GLASS Filter type: 4" Glass Fiber
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 5 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

6569

Recovery solvent(s)

☒ Acetone _____
☐ other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		<u>100</u>	
Impinger No. 2	<u>318</u>	<u>100</u>	<u>118</u>
Impinger No. 3		<u>0</u>	
Condenser			
Desiccant	<u>1483</u>	<u>1475</u>	<u>8</u>
Total			<u>126</u>

Integrated Gas Sampling Data:

Bag Pump No. 23B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 1326
Sampling rate: 4/100

Box No. 15 Bag No. 3
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 1452 (HRS)
cc/min Operator: ET

S/N of O₂ Analyzer used to monitor train outlet:

4

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

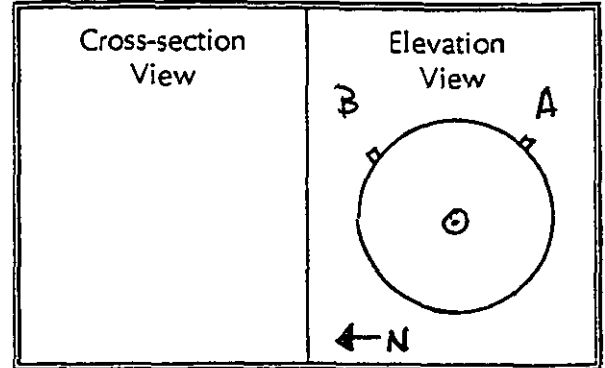
Job APRUS Date 5-24-88 1988 2 Run 3
 Operator ST-DU Operator Box No. 19 185 T/N/C
 Motor Box No. 231-6 Bar. Press. 29.78 inHg H2O
 Gasometer count. 1885 Nozzle Dia. 2.87 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inH ₂ O)	Orifice Meter (inH ₂ O)	Dep. Vol. (cf)	VAC. inHg	Temperatures (°F)				Oxygen (x/vv)
							Stack	Probe	Duct	Inlet	Gas/Duct
A 12	13.25	575.80	.48	1.47	5.62	4	128	248	251	46	73
11	9.5	575.64	.54	1.69	7.43	4	128	248	250	46	76
10	7.5	577.30	.62	1.89	9.38	5	130	247	251	45	76
9	10	579.20	.64	1.95	1.36	5	131				81
8	12.5	581.05	.69	2.10	3.42	5	131	250	251	46	82
7	15	583.01	.71	2.17	5.51	6	131				83
6	13.5	585.04	.72	2.21	7.62	7	129	251	250	48	84
5	20	587.19	.74	2.27	9.77	7	130				85
4	22.5	589.44	.75	2.31	1.93	8	129	252	251	47	85
3	25	591.61	.69	2.12	4.00	8	130				85
2	27.5	594.01	.69	2.12	6.07	8	128	254	255	45	85
1	30	596.06	.62	1.91	8.04	7	128				82
B 12	32.5	598.07	.52	1.60	9.84	6	129	256	260	45	77
11	35	599.87	.58	1.71	1.73	6	129				80
10	37.5	601.75	.68	2.08	3.77	7	129	258	262	46	82
9	40	603.78	.70	2.14	5.86	7	130				83
8	42.5	605.90	.72	2.21	7.97	7	130	261	265	49	84
7	45	607.99	.72	2.22	0.09	7	128				84
6	47.5	610.14	.70	2.16	2.18	7	128	260	263	50	84
5	50	612.18	.70	2.16	4.27	7	129				87
4	52.5	614.28	.68	2.10	6.34	7	128	250	260	50	87
3	55	616.38	.66	2.04	8.38	7	129				87
2	57.5	618.41	.65	2.02	0.41	7	128	255	260	47	87
1	60	620.40	.62	1.92	2.39	7	128				87
	(1453)	622.40									
Σ = 46.50											Avg. = 76.9
Q = 60											

EPA Method 2 Field Data Sheet

Drawing of Test Site

Job Cyprus
Source NO 12 HOOD VENT STACK
Test 3 Run Date 5/24/64
Stack Dimen. 70 IN.
Dry Bulb 118 °F Wet bulb 118 °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 29.18 IN. HG
Static Pressure -.38 IN. WC
Operators J. Van Haver & D. Vaaler
Pitot No. 4MS-6 C. .84

[illegible]

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
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Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cyprus Date 5/24/94 Test 3 Run 1
Source NO 12 HOOD VENT STACK No. of traverse points 24
Method 29 Filter holder: teflon Filter type: pullflex
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 2 cfm at 11 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

1281

Recovery solvent(s)

☐ acetone
☒ other(s) MECL₂ & INHNO₃

No. of probe wash bottles:

2
DVH

Sample recovered by:

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	506	400	106
Impinger No. 3			
Condenser			
Desiccant	1461	1450	11
Total			117

Integrated Gas Sampling Data:

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

123093-GASTACKIWPAMETHODS-0046RR

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Cyprus

Source NO 12 Hood VENT STACK
Date 5/24/94Operator DVA 4-DV
Meter Box No. 3
Custodian S. J. 1Pilot No. 4015-6 CP 84
Bar. Press. 29.18 inHg
Nozzle No. 6155 Nozzle Dia. 2.44 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Hood (ft/min)	Drifts Water (inHg)	Dis. Vol. (cf)	VAC. inHg	Temperature (°F)					Oxygen (xv/v)
							Stack	Probe	Duct	Inlet	Gas/Duct	
B 12	0955	458.20	.70	1.91	0.13	9	135	247	251	48	61	18.6
11	2.5	460.09	.68	1.86	2.05	9	135				62	18.7
10	5	462.05	.68	1.86	3.97	9	136				65	18.6
9	7.5	463.99	.71	1.85	5.93	9	136	250	252	49	68	18.7
8	10	465.99	.74	2.03	7.95	9	136				70	19.0
7	12.5	467.97	.74	2.05	9.97	9	132				71	18.0
6	15	469.99	.74	2.05	2.00	9	132	254	256	51	73	18.3
5	17.5	471.00	.71	1.98	3.99	9	133				74	18.4
4	20	473.97	.68	1.89	5.94	9	133				75	18.4
3	22.5	475.89	.57	1.59	7.73	8	134	257	258	51	76	18.5
2	25	477.75	.47	1.31	9.36	7	133				77	18.5
1	27.5	479.50	.47	1.32	0.99	7	133				77	18.4
A 12	30	481.13	.57	1.60	2.79	8	133	261	257	51	72	18.5
11	32.5	482.95	.67	1.87	4.72	9	133				76	18.6
10	35	484.84	.66	1.85	6.65	9	133				77	18.7
9	37.5	486.69	.72	2.03	8.68	9	129	260	258	51	78	18.5
8	40	488.72	.74	2.09	0.74	9	129				79	18.4
7	42.5	490.70	.74	2.22	2.86	10	127				79	18.7
6	45	492.72	.74	2.22	4.98	10	127	261	257	52	80	18.6
5	47.5	494.90	.74	2.22	7.10	10	128				80	18.4
4	50	497.04	.64	1.92	9.08	10	128				80	18.4
3	52.5	499.91	.60	1.80	0.99	9	128	263	258	53	80	18.5
2	55	500.91	.54	1.62	2.81	9	128				81	18.5
1	57.5	502.73	.50	1.51	4.56	8	128				81	18.6
	60	504.50										
	1058											
		V ₀ = 46.3		ΔH = 1.86							Avg. = 71.2	

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Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cyprus Date 5/24/94 Test 3 Run 2
Source NO 12 HOOD VENT STACK No. of traverse points 24
Method 29 Filter holder: tetlon Filter type: pallflex
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 12 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

1280

Recovery solvent(s)

☐ acetone
☒ other(s) 1. INH₂IO₃ + MECL₂

No. of probe wash bottles:

Sample recovered by:

2
PULL

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		} 400	
Impinger No. 2	505		105
Impinger No. 3			
Condenser			
Desiccant	1472	1461	11
Total			116

Integrated Gas Sampling Data:

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

123093-G:STACKWPMETHODSIS-0046RR

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Cypress Operator DAV + DV Pilot No. 44M5-6 Ep 84
 Source NO 12 Hood Vent Stack Meter Box No. 3 Bar. Press. 29.18 InHg H₂O 11 X
 Date 5/24/94 Gas analyzer serial. 9983 Nozzle No. 61255 Nozzle Dia. .249 IN.

Transfer Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inH ₂ O)	Driftless Meter (inH ₂ O)	Dep. Vol. (cf)	VAD. InHg	Temperature (°F)					Gas/Dust	Oxygen (xv/v)
							Stack	Probe	Oven	Imp.	Gas/Ln		
A 12	145	504.80	.56	1.70	6.65	8	128	257	254	46	67	67	18.6
11	2.5	506.70	.62	1.87	8.58	8	128				70	68	18.8
10	5	508.60	.68	2.07	0.61	10	125				73	69	18.7
9	7.5	510.60	.68	2.07	2.66	10	125	254	252	49	76	70	18.6
8	10	512.69	.72	2.20	4.77	10	125				76	70	18.7
7	12.5	514.66	.72	2.20	6.88	10	125				77	70	18.7
6	15	516.76	.72	2.20	8.96	10	125	256	257	50	77	71	18.7
5	17.5	518.87	.70	2.15	1.04	10	128				78	72	18.6
4	20	521.00	.70	2.14	3.00	10	128				80	72	18.4
3	22.5	523.03	.62	1.90	4.88	9	128	257	257	50	80	72	18.5
2	25	524.84	.57	1.75	6.78	9	128				81	73	18.4
1	27.5	526.81	.58	1.78	8.52	8	128				81	73	18.4
	30	528.58	.48	1.47	0.55	10	128				77	73	18.4
B 12	32.5	530.60	.66	2.03	2.60	10	128	257	256	50	80	74	18.4
11	35	532.73	.68	2.08	4.60	10	128				82	74	18.4
10	37.5	534.69	.68	2.09	6.74	10	128	256	256	51	82	74	18.4
9	40	536.80	.69	2.12	8.86	10	130				82	75	18.4
8	42.5	538.94	.72	2.21	0.98	10	130				82	75	18.4
7	45	541.00	.72	2.21	3.09	10	130	258	255	51	82	75	18.5
6	47.5	543.07	.71	2.18	5.19	10	127				84	76	18.4
5	50	545.11	.70	2.16	7.26	10	127				84	76	18.5
4	52.5	547.24	.68	2.10	9.28	10	127	258	256	53	84	76	18.5
3	55	549.28	.64	1.98	1.26	10	127				84	76	18.5
2	57.5	551.20	.62	1.92	3.14	9	127				84	76	18.4
1	60	553.15	.56	1.73									
	1250												
		Y = 48.35		H = 2.0							Avg. = 46.58		
		θ = 60											

INTERPOLL LABORATORIES, INC.
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Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cyprus Date 5/24/94 Test 3 Run 3
 Source NO 12 HOOD VENT STACK No. of traverse points 24
 Method 29 Filter holder: Teflon Filter type: pull flex
 Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
 Post test: 0 cfm at 12 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

Recovery solvent(s)

☐ acetone
☒ other(s) 1 IN HNO₃ + MECL₂

No. of probe wash bottles:

2

Sample recovered by:

DUH

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		} 400	
Impinger No. 2	504		104
Impinger No. 3			
Condenser			
Desiccant	1427	1410	17
Total			121

Integrated Gas Sampling Data:

Bag Pump No. _____
 Bag Material: 5-layer Aluminized Tedlar
 Pretest leak check: _____
 Time start: _____
 Sampling rate: _____

Box No. _____ Bag No. _____
 Size: 44 L
 cc/min at _____ in. Hg.
 (HRS) Time end: _____ (HRS)
 cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

123093-G:STACK\WP\METHODS\S-0046RR

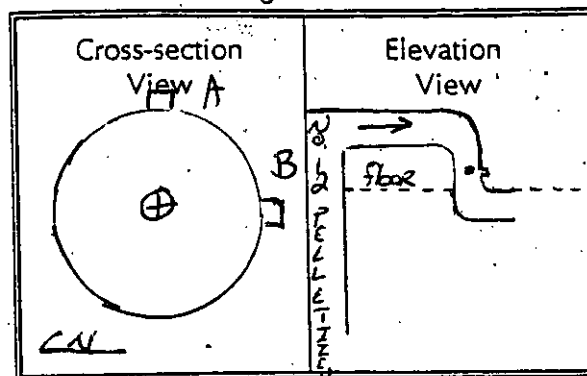
Job _____
 Date _____
 Cycles _____
 1. NO 12 HOOD KENT STACK _____
 5/24/94 _____
 1961 _____
 RUN 3 _____
 Operators _____
 Motor Box No. _____
 Computer Count. _____
 DUT & DV _____
 3 AM 1.80 IN NC _____
 Pilot No. 4MS-6 CP .84 _____
 Bar. Press. 22.18 INHG _____
 Nozzle No. 6455 Nozzle Dia. 2.75 IN. _____

[illegible]

INTERPOLL LABORATORIES, INC.
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EPA Method 2 Field Data Sheet

Drawing of Test Site

Job Cyprus Northshore Mining
Source No. 12 Rotoclose Inlet
Test 4 Run Date 5-24-94
Stack Dimen. 47 IN.
Dry Bulb 79.18 °F Wet bulb 79.18 °F
Manometer ☐ Reg. ☐ Exp. ☐ Elec.
Barometric Pressure 29.18 IN.HG
Static Pressure -2.40 IN.WC
Operators Roxi Rosenthal & Ken N
Pitot No. 22v-6 C 840



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: <u>8.5</u> IN.	Time Start: <u>3:54</u> HRS		
A 1	.021	1.00	9.50	1.90	354
2	.067	3.15	11.65	2.60	
3	.118	5.55	14.05	2.65	
4	.177	8.32	16.82	2.60	
5	.250	11.75	20.25	2.45	
6	.356	16.73	25.23	2.10	
7	.644	30.27	38.77	1.30	
8	.750	35.25	43.75	1.05	
9	.823	38.68	47.18	.98	
10	.882	41.45	49.95	1.05	
11	.933	43.85	52.35	1.10	
12	.979	46.00	54.50	1.05	
B 1				2.30	
2				2.45	
3				2.20	
4				2.10	
5				2.00	
6				1.85	
7				1.80	
8				1.70	
9				1.80	
10				1.70	
11				1.95	
12				2.00	
Temp. Meas. Device & S/N: <u>POT-7</u>				Time End: <u>3:56</u> HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

(D = 187)

INTERPOLL LABORATORIES, INC.
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Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CYPRUS Date 5-24-94 Test 4 Run 1
Source No. 12 Rotoblow Tank No. of traverse points 24
Method S Filter holder: SS. outstack Filter type: S.S. Thimble
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 6.00 cfm at 6 in. Hg. (vac) ☒
PITOTS @ 42 in. Hg.
Particulate Catch Data:

No. of filters used:

14

Recovery solvent(s)

☒ Acetone
☐ Other(s)

No. of probe wash bottles:

Sample recovered by:

1
RR / K.N.

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	103	100	3
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1474	1463	11
Total			14

Integrated Gas Sampling Data:

Bag Pump No. 22A
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start:
Sampling rate: 400

Box No. 6 Bag No. 1
Size: 44 L
cc/min at 10 in. Hg.
(HRS) Time end: (HRS)
cc/min Operator: RR

S/N of O₂ Analyzer used to monitor train outlet:

8

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job CYPRESS Operator R.R. K.N. Pitot No. 22N-6 CP 840
 Sample 10013 Rozoclovec FALKE (GSETH) Motor Box No. 8 Bar. Press. 29.78 InHg 120.5 K
 Date 5-24-74 Run 4 Gun 10078 Nozzle No. 10-3 Nozzle Dia. 1.00 In.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (in H ₂ O)	Driftless Meter Reading (in H ₂ O)	Obs. Vel. (ft)	VAC. in Hg	Temperature (°F)					Oxygen (X _v /v)	
							Stack	Probe	Duct	Ingr.	Gas In		Gas Out
A-12	(830)	366.90	1.01	1.01	8.29	2	350	247	247	44	63	26	20.9
11	2.5	368.37	1.15	.97	9.65	2	343	236	242	42	64	62	20.9
10	7.5	369.69	1.10	.93	9.97	2	347	239	240	39	65	63	20.9
9	10	372.38	1.05	.89	2.27	2	347	238	245	39	66	64	20.9
8	12.5	373.79	1.25	1.06	3.70	2	343	236	242	42	68	64	20.9
7	15	375.18	1.20	1.02	5.10	2	346	230	240	42	68	64	20.9
6	17.5	376.57	1.30	1.11	6.55	2	343	230	241	43	69	65	20.8
5	20	378.28	1.55	1.32	8.14	3	346	232	245	43	70	65	20.8
4	22.5	380.15	2.45	2.10	0.14	4	342	234	256	44	71	68	20.8
3	25	382.32	2.65	2.26	2.22	4	346	252	254	44	72	68	20.8
2	27.5	384.113	2.70	2.30	4.32	4	351	253	251	46	72	66	20.8
1	30	386.38	2.60	2.22	6.38	4	347	252	250	43	72	67	20.8
B-12	32.5	388.12	1.70	1.45	8.05	3	347	260	248	44	73	67	20.8
11	35	389.68	1.55	1.32	9.64	3	352	264	250	44	72	67	20.8
10	37.5	391.19	1.50	1.25	1.19	3	365	266	246	37	72	67	20.9
9	40	392.79	1.60	1.37	2.81	3	348	266	246	39	72	67	20.9
8	42.5	394.46	1.70	1.45	4.48	3	347	265	243	45	72	67	20.9
7	45	396.20	1.70	1.46	6.16	3	343	263	239	44	72	67	20.9
6	47.5	398.01	1.90	1.63	7.93	4	342	265	240	38	72	67	20.9
5	50	399.83	2.05	1.75	9.76	4	347	264	240	40	72	67	20.9
4	52.5	401.58	1.95	1.66	1.54	4	350	264	242	40	72	67	20.9
3	55	403.30	1.85	1.58	3.29	4	346	263	241	41	72	67	20.9
2	57.5	405.03	1.70	1.45	4.96	3	346	264	238	42	72	67	20.8
1	60	406.62	1.65	1.41	6.61	3	345	264	238	43	72	67	20.8
	(934)												
	0 = 60												
		V _s = 39.72	ΔH = 1.46								Avg. = 68.0		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CYORUS Date 5-24-94 Test 4 Run 2
Source NO. 12 ROTACONE INLET (Aval) No. of traverse points 24
Method S Filter holder: S.S. OUTSTACK Filter type: S.S. Thimble
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.00 cfm at 6 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

Recovery solvent(s)

17

☒ Acetone
☐ Other(s)

No. of probe wash bottles:
Sample recovered by:

1
R.O. / K.N.

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	103	100	3
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1482	1474	8
Total			11

Integrated Gas Sampling Data:

Bag Pump No. 22A
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 00
Time start: 400
Sampling rate:

Box No. 6 Bag No. 2
Size: 44 L
cc/min at 10 in. Hg.
(HRS) Time end: RR (HRS)
cc/min Operator:

S/N of O₂ Analyzer used to monitor train outlet:

8

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job CYPRESS Operator R.R. & K.O. Pilot No. 22-6 Cp 840
 Source 100% ROTRODUE INLET (CYPRESS) Motor Box No. 8 Bar. Press. 29.78 IN HG N2O
 Date 5-24-74 1961 4 Run 2P AH 10028 Nozzle No. 10-3 Nozzle Dia. 10 IN.

Transfer Point No.	Sampling Time (min)	Sample Volume (cc)	Velocity Head (in H ₂ O)	Driftless Meter (in H ₂ O)	Deg. Vol. (cc)	VAD. in Hg	Temperatures (°F)					Oxygen (x/v)	
							Stack	Probe	Dry	Wet	Gas In		Gas Out
B-12	1015	406.75	1.40	1.20	8.26	2	382	238	235	43	65	65	20.9
	2.5	408.30	1.15	.98	7.63	2	382	242	240	43	66	65	20.9
	5	409.74	1.05	.90	6.94	2	381	254	243	43	68	66	20.9
	7.5	411.14	.95	.81	6.19	2	385	255	250	44	68	66	20.9
	10	412.23	1.10	.94	3.53	2	385	261	248	43	69	66	20.9
	12.5	413.55	1.20	1.03	4.94	2	380	255	247	43	70	66	20.9
	15	414.98	1.40	1.22	6.47	2	367	257	250	40	71	67	20.9
6	17.5	416.53	1.30	1.12	7.94	2	377	266	254	40	72	67	20.9
5	20	418.02	1.40	1.24	9.48	2	359	266	253	39	72	67	20.9
4	22.5	419.48	1.60	1.40	1.13	2	367	268	255	39	73	68	20.9
3	25	421.15	1.50	1.30	2.71	2	375	266	251	38	73	68	20.9
2	27.5	422.70	1.80	1.57	4.45	2	375	261	256	39	74	68	20.9
1	30	424.48	.95	.83	5.71	2	375	261	255	39	72	68	20.9
A-12	32.5	425.68	1.00	.88	7.08	2	360	247	253	39	73	69	20.9
	35	427.15	.86	.76	8.23	2	361	257	250	40	73	69	20.9
	37.5	428.28	.95	.84	9.50	2	365	250	247	41	73	68	20.8
	40	429.51	1.10	.99	0.88	2	347	238	245	42	74	69	20.8
	42.5	430.90	1.20	1.05	2.31	2	369	250	242	41	74	69	20.8
	45	432.43	1.30	1.16	3.81	2	357	243	239	40	74	69	20.8
	47.5	434.02	1.90	1.66	5.59	3	372	245	240	36	75	70	20.8
	50	435.57	2.05	1.80	7.46	3	368	243	242	45	77	71	20.8
	52.5	437.50	2.30	2.03	9.44	3	368	246	243	41	77	71	20.8
	55	439.49	2.50	2.20	1.50	4	371	247	243	45	77	71	20.9
	57.5	441.57	2.45	2.20	3.56	3	354	246	244	44	77	71	20.9
60	443.59												
(1120)													
	0 = 60												
		V ₀ = 36.82		W = 1.26								Av _g = 70.2	

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CYPRESS Date 5-24-94 Test 4 Run 3
Source No. 12 ROTOCLOVE INLET No. of traverse points 24
Method 5 Filter holder: S.S. OUTSTACK Filter type: S.S. THIMBLE
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.00 cfm at 6 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

19

Recovery solvent(s)

☒ Acetone _____
☐ Other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
R.R. / K.N.

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	<u>103</u>	<u>100</u>	<u>3</u>
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	<u>1436</u>	<u>1426</u>	<u>10</u>
Total			<u>13</u>

Integrated Gas Sampling Data:

Bag Pump No. 22A
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: _____
Sampling rate: 400

Box No. 6 Bag No. 3
Size: 44 L
cc/min at 10 in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: RR

S/N of O₂ Analyzer used to monitor train outlet: 8

123093-GASTACKIWPIMETHODS-0046RR

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job CYPRESSSource 06-12-2004 4 11:45 APOperator RR A K.W.
Meter Box No. 8
Coulter Count. 10028Pilot No. 22V-6 CP
Bar. Press. 29.1 inHg
Nozzle Dia. 20 in.

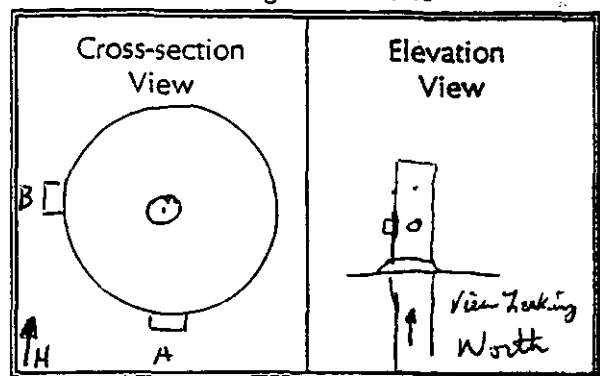
Transfer Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inHg)	Orifice Meter (inHg)	Dep. Vel. (ft)	VAC. inHg	Temperature (°F)				Gas/Dut	Oxygen (Xv/v)
							Stack	Probe	Oven	Ingr.		
A-12	12.5	443.70	.98	.87	4.99	2	354	254	243	38	69	20.9
11	2.5	445.06	1.05	.92	6.32	2	365	254	243	39	70	20.9
10	7.5	446.39	1.00	.89	7.63	2	357	251	244	38	71	20.9
9	10	447.66	1.15	1.02	9.03	2	360	251	244	39	72	20.9
8	12.5	450.40	1.0	.88	5.33	2	365	257	245	39	73	20.9
7	15	451.85	1.30	1.15	1.82	2	363	260	243	38	75	20.9
6	17.5	453.55	1.70	1.51	3.53	2	359	260	244	38	76	20.9
5	20	455.38	2.00	1.79	5.39	3	357	264	245	38	77	20.9
4	22.5	457.30	2.20	1.76	7.34	3	363	263	246	38	79	20.9
3	25	459.26	2.15	1.91	9.26	3	365	257	246	38	79	20.9
2	27.5	461.06	1.80	1.60	10.2	3	364	259	248	38	80	20.9
1	30	462.81	1.85	1.65	2.81	2	365	257	251	37	80	20.9
B-12	32.5	464.37	1.30	1.16	4.32	2	363	257	250	40	78	20.9
11	35	465.90	1.30	1.15	5.81	2	371	261	255	40	80	20.9
10	37.5	467.33	1.20	1.04	7.24	2	385	262	252	40	80	20.9
9	40	468.66	1.10	.95	8.60	2	389	259	250	41	81	20.9
8	42.5	470.01	1.25	1.08	0.06	2	391	266	252	40	81	20.9
7	45	471.48	1.35	1.18	1.57	2	385	266	248	40	81	20.9
6	47.5	473.17	1.60	1.43	3.24	2	364	259	246	41	82	20.9
5	50	474.85	1.55	1.39	4.89	2	361	266	251	41	83	20.9
4	52.5	476.52	1.50	1.34	6.51	2	365	263	257	41	83	20.9
3	55	478.18	1.50	1.36	8.14	2	357	264	254	41	83	20.9
2	57.5	479.89	1.70	1.53	9.87	2	363	263	255	41	83	20.9
1	60	481.66	1.70	1.53	1.60	2	363	263	255	41	83	20.9
(1318)												
		V _s = 37.96		ΔH = 1.30							Avg. = 75.5	

(612) 786-6020

Drawing of Test Site

Pitot No.

CYPRUS NORTH SHORE
No. 12 Pelletizing Refractory Mutch
5 Run Date 5-24-94
45.5
32 °F Wet bulb
☒ Reg. ☐ Exp ☐ Elec
ssure 29.18
- 1.05
SB + DM
22V-5 C 840



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length:	IN.	Time Start: 0736	HRS
4-1	.026	1.18	5.68	1.35	52
2	.082	3.73	8.23	1.80	52
3	.146	6.64	11.14	2.05	52
4	.226	10.28	14.78	2.20	52
5	.342	15.56	20.06	2.22	52
6	.458	29.94	34.44	2.20	52
7	.774	35.22	39.72	2.40	52
8	.854	38.86	43.76	2.25	52
9	.918	41.77	46.27	2.15	52
10	.974	44.32	48.82	2.15	52
B 1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
Temp. Meas. Device & S/N: Digital T _k - PDT 29				Time End: 0745 HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

Time End: 0745 HRS

032594-G:STACK\WP\FORMS\5-392.i

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress North Shore Date 5-24-94 Test 5 Run 1
Source No. 12 pellets North Shore Stock No. of traverse points 20
Method 15 Filter holder: 4" G. Lox Filter type: 4" G. F.
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.00 cfm at 15 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

6573

Recovery solvent(s)

☒ acetone
☐ other(s)

No. of probe wash bottles:

Sample recovered by:

1
SB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	588	506	82
Impinger No. 3			
Condenser			
Desiccant	1506	1485	18
Total			100

Integrated Gas Sampling Data:

Bag Pump No. 228
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 00
Time start: 0830
Sampling rate: 400

(Ambient air)
Box No. 8 Bag No. 1
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 0932 (HRS)
cc/min Operator: SB

S/N of O₂ Analyzer used to monitor train outlet: 11

1001 Cyprus North Shore
5001114 No. 12 Pelagias R.
1001114 5-24-96 1061

Operator _____
Meter Box No. 13 x III 1
Submeter count. 10347
SB + DM

53 + DM
3 x 11 1.93 11-11-47

Pilot No. 22V-5-
Bar. Press. 29.18
NOX/10 No. 45.3 NOX/10 Dia
Cp .840

1842-71.

[illegible]

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress North Shore Date 5-24-94 Test 5 Run 2
Source No. 12 Pelletier Motorhome Hatch No. of traverse points 20
Method 1-5 Filter holder: 4" 6 lens Filter type: 4" Glass fiber
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.00 cfm at 15 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

6574

Recovery solvent(s)

☒ Acetone
☐ Other(s)

No. of probe wash bottles:

Sample recovered by:

SB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	<u>575</u>	<u>507</u>	<u>68</u>
Impinger No. 3			
Condenser			
Desiccant	<u>1579</u>	<u>1568</u>	<u>11</u>
Total			<u>79</u>

Integrated Gas Sampling Data:

Bag Pump No. 22B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 00
Time start: 0
Sampling rate: 400

(ambient air)
Box No. 8 Bag No. 2
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: SB (HRS)
cc/min Operator: SB

S/N of O₂ Analyzer used to monitor train outlet:

11

<u>Job</u>	Cypress North Shore				
<u>Suite No.</u>	No. 12 Pelletier, Potomac				
<u>Date</u>	5-27-96	1981	5	Rm	3
<u>Operator</u>	SB + DM				
<u>Water Box No.</u>	KHP 1-BB TW UC				
<u>Connector Code</u>	14	1056C			
<u>Pilot No.</u>	22U-5	Cy	-210		
<u>Bur. Press.</u>	29.1P	10H4	H2D	X	
<u>Mozzle No.</u>	4-3 Mozze	Dia	.83=IN.		

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress North Shore Date 5-24-94 Test 6 Run 3
Source No. 12 Pelletier Potomac Street No. of traverse points 20
Method 1-5 Filter holder: 4" Glass Filter type: 4" Glass Fiber
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.00 cfm at 15 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

6575

Recovery solvent(s)

☒ Acetone
☐ Other(s)

No. of probe wash bottles:

Sample recovered by:

1A
SB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	<u>354</u>	<u>496</u>	<u>58</u>
Impinger No. 3			
Condenser			
Desiccant	<u>1516</u>	<u>1506</u>	<u>10</u>
Total			<u>68</u>

Integrated Gas Sampling Data:

Carbont Air

Bag Pump No. 223
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 00
Time start: _____
Sampling rate: 400

Box No. _____ Bag No. 3
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: SB

S/N of O₂ Analyzer used to monitor train outlet: 11

123093-G:STACKIWPMMETHODS-0046RR

Legend

North Shore
No. 12, Zelleb
5-1-5

North Shore
No. 12, College Potomac Stuck
5-14-92 1081 5 RUN 3

[illegible]
$$\begin{array}{r} 1.0060 \\ 4 \overline{) 4.0240} \\ \underline{4} \\ 0 \\ 0 \end{array}$$

20-11

Pat. No. 2,111,111

✓-5-
25.18
6-3

1111

02H
840

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job COPPER Date 5-24 Test 6 Run 1
Source N 12 Hook Vant Steel No. of traverse points 24
Method 5 Filter holder: 36mm Filter type: 4" Glass Fiber
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 11 cfm at 9 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

6568

Recovery solvent(s)

☒ acetone
☐ other(s)

No. of probe wash bottles:

Sample recovered by:

1
ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		{ 100 }	
Impinger No. 2	308	{ 100 }	108
Impinger No. 3		{ 0 }	
Condenser			
Desiccant	1470	1453	17
Total			125

Integrated Gas Sampling Data:

Bag Pump No. 238
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 1521
Sampling rate: 400

Box No. 16 Bag No. 7
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: 1622 (HRS)
cc/min Operator: ET

S/N of O₂ Analyzer used to monitor train outlet:

INTERPOLA LABORATORIES EPA METHOD 5 FILE DATA SHEET

Job CYPRUS Date 5-24-94 Source NO. 12 HAD KENT STACK Operator 5-T-DV Meter Box No. 11 Stack 1.80 IN HC 9880 Pilot No. 234-6 Cp 1.84 Bar. Press. 29.8 inHg H₂O Nozzle No. 7-4 Nozzle Dia. 2.47 in.

Transfer Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inHg)	Orifice Meter (inHg)	Obs. Vol. (cf)	VAC. inHg	Temperatures (°F)					Oxygen (xv/v)	
							Stack	Probe	Oven	Insp.	Gas/Ln		Gas/Dut
13-12	15.20	263.20	1.70	2.13	5.29	6	128	240	242	44	76	69	
11	5	265.30	1.68	2.10	7.34	6	113				78	69	
10	7.5	267.40	1.68	2.10	9.40	6	113	248	250	44	79	69	
9	10	269.35	1.49	2.18	1.57	7	113				81	69	
8	12.5	271.44	1.72	2.28	3.65	7.5	114	251	254	45	82	69	
7	15	273.60	1.72	2.29	5.81	7.5	112				83	69	
6	17.5	275.74	1.70	2.25	7.94	7.5	112	254	250	45	83	70	
5	20	277.90	1.70	2.23	10.06	7.5	112				84	70	
4	22.5	280.00	1.69	2.20	2.18	7.5	112	256	254	46	85	70	
3	25	282.14	1.68	2.15	4.27	7.5	117				85	71	
2	27.5	284.30	1.66	2.09	6.34	7.1	117	250	252	46	85	71	
1	30	286.33	1.62	1.97	8.34	7.1	115				85	71	
A-12	32.5	288.35	1.50	1.59	1.14	6	116	255	256	45	85	71	
11	35	290.14	1.68	2.15	2.24	7.5	117				87	71	
10	37.5	292.26	1.70	2.22	4.36	8.0	117	257	260	46	87	72	
9	40	294.39	1.70	2.22	6.50	8.0	117				87	72	
8	42.5	296.42	1.72	2.30	8.67	8.0	112	258	264	46	87	72	
7	45	298.67	1.72	2.30	10.84	8.0	112				88	72	
6	47.5	300.86	1.70	2.24	2.98	8.0	112	257	262	46	88	72	
5	50	303.00	1.68	2.18	5.09	8.0	112				88	72	
4	52.5	305.12	1.65	2.09	7.16	7.9	111	254	260	46	88	72	
3	55	307.20	1.60	1.93	9.14	7.8	111				87	74	
2	57.5	309.20	1.52	1.67	11.49	6.5	111	252	259	46	87	74	
1	60	311.05	1.50	1.61	13.81	6.0	112				87	74	
	(1623)						111				87	74	
Σ = 60		Avg = 778											

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

C-38

6-52-5
2101 401003
Cylrus

[illegible]

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 901 902 903 904 905 906 907 908 909 910 911 912
 913 914 915 916 917 918 919 920 921 922 923 924
 925 926 927 928 929 930 931 932 933 934 935 936
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 949 950 951 952 953 954 955 956 957 958 959 960
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67-21
No. 11
Unit. 11

1.80 GR AC

11-2201
J. J. S.
P. 1011

734-6
28.18
7-21

0211 41220
5401
2758

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cyanide Date 5-24-94 Test 6 Run 3
Source 51012 Fleet Vaport No. of traverse points 24
Method 5 Filter holder: 4" Glass Filter type: 4" Glass Fiber
Sample Train Leak Check:

Prerest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 8 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

6571

Recovery solvent(s)

☒ Acetone
☐ Other(s)

No. of probe wash bottles:

Sample recovered by:

1
ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		{ 100 }	
Impinger No. 2	320	{ 100 }	120
Impinger No. 3		0	
Condenser			
Desiccant	1418	1402	16
Total			136

Integrated Gas Sampling Data:

Bag Pump No. 23B
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start:
Sampling rate: 100

Box No. 10 Bag No. 3
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: (HRS)
cc/min Operator: ET

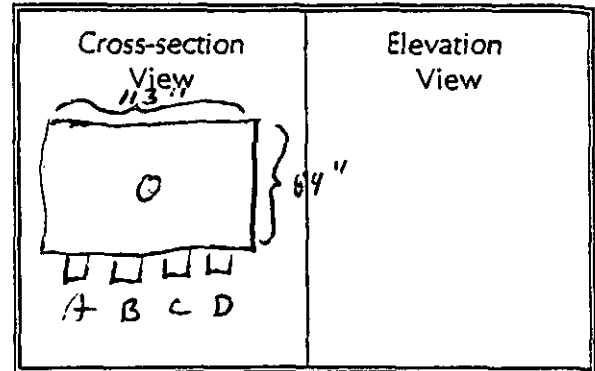
S/N of O₂ Analyzer used to monitor train outlet:

123093-GASTACK\WPMETHODS\0046RR

INTERPOLL LABORATORIES, INC.
(612) 786-6020
EPA Method 2 Field Data Sheet

Drawing of Test Site

Job Cyprus / North Shore, 4700
Source Acid Exhaust / Inlet
Test 7 Run Date 5-24-94
Stack Dimen. 84 X 113 IN.
Dry Bulb 12.4 °F Wet bulb 20.5 °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 29.18 IN.HG
Static Pressure +1.55 IN.WC
Operators M. Kuchler + E. Davis
Pitot No. 27V - E C₂ .04



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: <u>17.0</u> IN.	Time Start: <u>1453</u> HRS		
A-1		2.00	24.00	1.72	
2		11.00	39.00	1.55	
3		38.00	52.00	1.37	
4		49.00	66.00	1.03	
5		63.00	80.00	1.01	
6		77.00	94.00	1.05	
B-1				1.91	
2				1.88	
3				1.97	
4				1.80	
5				1.78	
6				1.84	
C-1				1.72	
2				1.69	
3				1.81	
4				1.87	
5				1.79	
6				1.80	
D-1				1.85	
2				1.81	
3				1.75	
4				1.82	
5				1.70	
6				1.69	
Temp. Meas. Device & S/N: <u>PNT-28 / TC</u>				Time End: <u>1453</u> HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

032594-G:\STACK\WP\FORMS\S-392.1

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress / North Shore, new Date 5-24-94 Test 7 Run 21
Source Boat Exhaust / Islet No. of traverse points 24
Method 17 Filter holder: S.S. Filter type: S.S. Thimble
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.02 cfm at 9 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

38

Recovery solvent(s)

☒ Acetone _____
☐ Other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
Mr. Kenneth Lee + E. Turner

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser	<u>76</u>	<u>0</u>	<u>76</u>
Desiccant	<u>1435</u>	<u>1410</u>	<u>25</u>
Total			<u>101</u>

Integrated Gas Sampling Data: N4 / Trailer

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet:

5

[illegible]

Operator _____
Water Box No. 16 HP 1.95 IN HC
Counter cost. 9971

Pilot No. 27V-6 CP 10/1
Bar. Press. 29.13 in Hg H2O 23.4 X
Nozzle No. 53 Nozzle Dia 1.12 in.

[illegible]

INTERPOL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress / North Shore, 4906 Date 5-14-94 Test 2 Run 2
Source Wood Exhaust / Trailer No. of traverse points 24
Method 17 Filter holder: S.S. Filter type: S.S. Thimble
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.02 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

38

Recovery solvent(s)

☒ acetone _____
☐ other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
McKibben + E. J. Davis

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser	<u>62</u>	<u>0</u>	<u>62</u>
Desiccant	<u>1426</u>	<u>1405</u>	<u>21</u>
Total			<u>93</u>

Integrated Gas Sampling Data: NA / Trailer

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: 5

123093-G:\STACK\WPMETHODS\0046RR

Sub Cupress (Fourth Shore, West
 Sub 11th Ave. Exhaust) Outlet
 Date 5-24-94 1051 3 Run 2

Operators 491 Kaeh for F.F. Jones
 Master Box No. 16 SHA 1291 IN NC
 Computer Count. 19971

Pitot No. 29V-B CP, 61
Burr. Press. 29115 in Hg H20 103 X
Nozzle No. 5-3 Nozzle Dia 1.90 in.

[illegible]

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress: Mouth Share, etc Date 5-24-94 Test 7 Run 3
Source Head Exhaust / Inlet No. of traverse points 24
Method 17 Filter holder: SS Filter type: SS Thimble
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.02 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

41

Recovery solvent(s)

☒ Acetone
☐ other(s)

No. of probe wash bottles:

Sample recovered by:

1
McKeehan & F. Jones

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser	<u>79</u>	<u>0</u>	<u>79</u>
Desiccant	<u>1365</u>	<u>1342</u>	<u>23</u>
Total			<u>102</u>

Integrated Gas Sampling Data: Wt / Trailer

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet:

5

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Cypress Laboratory Skaggs, Ariz
 Source Head Exhaust / Outlet
 Date 5-24-94 Test 1 Run 3

Operators Audrey & Jeff
 Meter Box No. 16 IN MC
 Computer soft. 9971

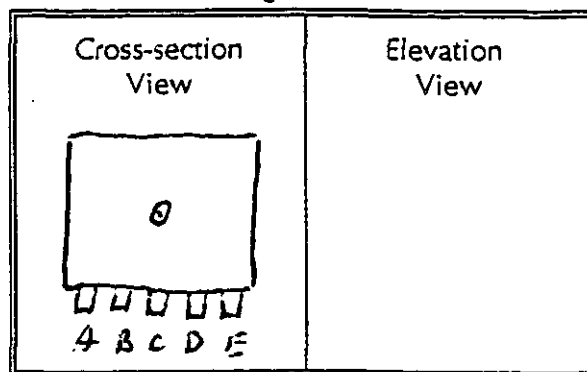
Pitot No. 220-5 Dp 0.5
 Bar. Press. 29.16 inHg H₂O
 Nozzle No. 5-3 Nozzle Dia 1/8 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Driftless Meter (inWC)	Det. Vol. (cf)	VAC. inHg	Temperatures (°F)					Oxygen (Kv/v)	
							Stack	Probe	Dry	Wet	Gas/Ln		Gas/Out
D-6	1805	631.40	1.07	1.13	2.86	2	203	243	257	46	74	19.9	
	2.5	632.05			4.31	2	206	249	254	46	74	19.9	
	5	634.27	1.06	1.11	5.76	2	204	249	256	46	74	19.9	
	7.5	635.73	1.05	1.11	7.37	3	205	245	260	46	74	20.0	
	10	637.42	1.30	1.37	9.12	3.5	205	247	262	47	74	20.0	
	12.5	639.10	1.53	1.62	0.94	3.5	205	251	263	47	74	20.1	
	15	640.89	1.65	1.75	2.91	4.5	206	253	260	48	74	20.0	
C-6	17.5	642.93	2.02	2.14	4.97	4.5	205	250	257	48	74	20.0	
	20	644.97	1.88	1.99	6.51	4.5	204	244	257	49	74	20.2	
	22.5	646.80	1.90	2.02	8.77	4.5	204	246	261	49	74	20.3	
	25	648.74	1.95	1.96	0.75	5	205	250	256	49	74	20.3	
	27.5	650.73	1.95	2.07	2.78	5	204	251	258	49	74	20.3	
	30	652.71	2.03	2.16	4.79	5	204	246	255	51	75	20.3	
B-6	32.5	654.72	2.00	2.13	6.79	5	205	249	252	51	75	20.4	
	35	656.72	2.00	2.12	8.71	4.5	206	248	256	51	75	20.4	
	37.5	658.65	1.83	1.94	0.64	4.5	203	245	254	52	75	20.3	
	40	660.54	1.83	1.95	2.54	4.5	204	247	258	52	75	20.4	
	42.5	662.45	1.80	1.92	4.50	5	207	244	257	52	75	20.4	
	45	664.43	1.90	2.01	6.12	3	205	242	259	52	76	20.3	
A-6	47.5	666.08	1.29	1.37	7.69	3	205	245	261	52	76	20.3	
	50	667.65	1.21	1.29	9.15	3	203	245	260	52	76	20.3	
	52.5	669.22	1.10	1.18	0.99	3.5	203	249	257	53	76	20.3	
	55	670.05	1.33	1.42	2.63	4	204	252	255	53	76	20.3	
	57.5	672.52	1.44	1.59	4.63	5	206	250	252	53	76	20.3	
	60	674.51	1.98	2.10									
V ₀ =													
1907													

INTERPOL LABORATORIES, INC.
(612) 786-6020
EPA Method 2 Field Data Sheet

Drawing of Test Site

Job Cypress / Silver Bay, ALA
Source Waste Gas Unit / Inlet
Test 0 Run 0 Date 5-25-94
Stack Dimen. 92 X 92 IN.
Dry Bulb 552 °F Wet bulb 140 °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.92 IN.HG
Static Pressure 11.35 IN.WC
Operators M. Kachler & E. Jvers
Pitot No. 274-10 C_p 1.94



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: <u>17.0</u> IN.	Time Start: <u>0900</u> HRS		
A - 1		<u>9.20</u>	<u>26.20</u>	<u>1.40</u>	
2		<u>27.60</u>	<u>44.60</u>	<u>1.55</u>	
3		<u>46.00</u>	<u>63.00</u>	<u>2.25</u>	
4		<u>64.40</u>	<u>81.40</u>	<u>2.30</u>	
5		<u>82.80</u>	<u>99.80</u>	<u>2.85</u>	
B - 1				<u>2.00</u>	
2				<u>3.95</u>	
3				<u>4.00</u>	<u>↑</u>
4				<u>4.15</u>	<u>↑</u>
5				<u>4.20</u>	<u>552</u>
C - 1				<u>4.25</u>	
2				<u>4.00</u>	<u>↓</u>
3				<u>3.90</u>	
4				<u>4.00</u>	
5				<u>4.15</u>	
D - 1				<u>3.10</u>	
2				<u>3.75</u>	
3				<u>3.10</u>	
4				<u>3.20</u>	
5				<u>3.00</u>	
E - 1				<u>2.50</u>	
2				<u>2.75</u>	
3				<u>2.80</u>	
4				<u>3.00</u>	
5				<u>3.10</u>	
Temp. Meas. Device & S/N: <u>PDT-28 / TC</u>				Time End: <u>0912</u> HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress / Silver Bay, ALA Date 5-25-94 Test 8 Run 1
Source Waste Gas Unit / Inlet No. of traverse points 25
Method 5 Filter holder: 5-5 Filter type: 5-5 Thimble
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

30

Recovery solvent(s)

☐ acetone
☒ Other(s) MeCl₂

No. of probe wash bottles:

Sample recovered by:

1
M. Kuehlert F. J. Jers

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	549	500	49
Impinger No. 3			
Condenser			
Desiccant	1442	1426	16
Total			64

Integrated Gas Sampling Data: NA / Trailer

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: 5

123093-GASTACKWPAMETHODS-0046RR

INTERPOL LABORATORIES EPA METHOD 5 F U DATA SHEET

Job Copper / Silver Assay, on
 Sample Waste Gas Unit / Fuel
 Date 5-25-94 1651 8 Run 1

Operator M. Kuehler & E. J. J. J.
 Meter Box No. 16 195 TH DE
 Gasometer Count. 9927

Pilot No. 27U-10 CP 84
 Bar. Press. 29.92 inHg H2O
 Nozzle No. 5-3 Nozzle Dia 19.0 in.

Transfer Point No.	Sampling Time (min)	Sample Volume (cc)	Velocity Head (inWC)	Drifts Meter (inWC)	Dep. Vol. (cc)	VAD. inHg	Temperatures (°F)				Oxygen (K/v/v)	
							Stack	Probe	Oven	Inpy.	Gas/In	Gas/Out
A-5	09:15	683.50	3.65	2.06	5.44	9	552	258	250	43	63	62
4	5	695.48	3.40	2.14	2.43	9.5	552	253	256	43	66	62
3	7.5	689.42	3.60	2.27	9.48	10	550	254	255	43	69	62
2	10	690.81	1.55	.98	0.83	5	550	257	259	44	70	62
1	12.5	692.18	1.65	1.04	2.23	5	555	251	257	44	72	62
B-5	15	694.43	4.25	2.68	4.46	12	555	247	254	44	75	63
4	17.5	696.60	4.10	2.60	6.66	12	556	249	258	45	77	63
3	20	698.75	3.95	2.50	8.93	12	558	252	261	45	78	64
2	22.5	701.00	4.15	2.63	1.05	13	560	252	264	45	79	64
1	25	702.51	1.90	1.21	2.55	6	560	254	260	45	79	65
C-5	27.5	704.74	4.10	2.61	4.77	13	558	253	257	45	80	65
4	30	706.95	4.05	2.57	6.97	13	559	250	252	47	81	66
3	32.5	709.13	3.80	2.43	9.11	13	555	247	258	47	82	66
2	35	711.28	4.00	2.55	1.30	13	560	251	255	47	82	67
1	37.5	713.50	4.20	2.68	3.54	13.5	559	250	257	48	83	67
D-5	40	715.50	3.10	1.98	5.48	9	560	248	251	48	83	68
4	42.5	717.41	3.00	1.91	2.38	9	562	245	255	48	83	69
3	45	719.38	3.65	2.08	9.37	9.5	560	247	258	48	85	69
2	47.5	721.34	3.30	2.12	1.37	9.5	559	248	256	48	86	69
1	50	723.30	3.15	2.02	3.33	9.5	559	244	253	49	87	70
E-5	52.5	725.65	3.10	1.99	5.28	9.5	560	239	255	49	84	71
4	55	727.10	2.80	1.80	7.13	9	560	243	250	49	87	71
3	57.5	729.05	3.10	1.99	9.08	9	560	248	247	51	88	72
2	60	730.90	2.95	1.90	0.99	9	559	245	251	51	89	72
1	62.5	732.74	2.80	1.81	2.85	9	559	245	254	51	90	72
VAD = 49.24							559	245	254	51	90	72
VAD = 62.5							559	245	254	51	90	72
VAD = 103.1							559	245	254	51	90	72
							559	245	254	51	90	72
							559	245	254	51	90	72
							559	245	254	51	90	72
							559	245	254	51	90	72
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							559	245	254	51	90	72
							559	245	254	51	90	72
							559	245	254	51	90	72
							559	245	254	51	90	72
							559	245	254	51	90	72

INTERPOLL LABORATORIES, INC.
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Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress / Silver Bay, MN Date 5-25-94 Test 8 Run 2
Source Waste Gas Unit / Inlet No. of traverse points 25
Method 5 Filter holder: S.S. Filter type: S.S. Thimble
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.02 cfm at 17 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

35

Recovery solvent(s)

☐ acetone _____

☐ other(s) _____

No. of probe wash bottles:

Sample recovered by:

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	<u>534</u>	<u>409</u>	<u>46</u>
Impinger No. 3			
Condenser			
Desiccant	<u>1379</u>	<u>1365</u>	<u>14</u>
Total			<u>60</u>

Integrated Gas Sampling Data: NA Trailer

Bag Pump No. _____

Bag Material: 5-layer Aluminized Tedlar

Pretest leak check: _____

Time start: _____

Sampling rate: _____

Box No. _____

Size: 44 L

cc/min at _____ in. Hg.

(HRS) Time end: _____ (HRS)

cc/min Operator: _____

5

S/N of O₂ Analyzer used to monitor train outlet:

123093-GASTACK\WP\METHODS\S-0046RR

Job Cypress / Silver Bay, MN
 Supervisor White Bear Unit
 Date 5-25-84
 Entry 1061
 Run 2

Operator M. Kaehlert E. Jester
 Mailer Box No. 110
 Cassette 500 ft. 16

Pilot No. 27U-70 54
 Bar. Press. 28.92 1011g
 Horiz. No. 5-3 Horiz. 14 Div. 170 11H.

Inversion Point No.	Sampling Time (min)	Sample Volume (cc)	Velocity Head (in H ₂ O)	Drifts Water (in H ₂ O)	Des. Vol. (cc)	VAC. in Hg	Temperature (°F)				Oxygen (cc/vol)		
							Block	Probe	Depth	Temp.			
A-6	(110)	733.10											
4	2.5	734.85	2.10	1.50	4.78	6	555	240	260	48	74	73	16.8
3	5	736.68	2.55	1.61	6.63	7	558	248	263	48	77	73	16.8
2	7.5	738.56	2.80	1.99	8.57	25	558	249	258	50	80	73	16.7
1	10	740.62	3.00	2.14	10.59	85	559	253	252	50	83	73	16.8
B-5	12.5	742.37	2.40	1.73	2.40	7	555	247	250	50	85	73	16.8
4	15	743.95	1.80	1.30	3.97	6	555	250	255	51	85	73	17.0
3	17.5	745.66	1.90	1.37	5.59	6	552	252	260	51	87	74	17.0
2	20	747.23	1.70	1.23	7.13	5	554	256	257	49	88	74	17.0
1	22.5	748.70	1.85	1.34	9.73	5	554	251	260	48	89	74	17.0
C-5	25	750.25	1.70	1.23	10.27	5	555	250	262	48	90	74	17.0
4	27.5	751.88	1.70	1.23	1.81	5	554	245	264	47	88	75	16.9
3	30	754.17	3.85	2.79	9.12	11.5	552	243	261	47	91	75	17.0
2	32.5	756.47	4.00	2.88	6.47	13	560	248	257	47	91	75	17.1
1	35	758.75	3.90	2.91	8.79	13	562	251	260	47	90	76	17.1
D-5	37.5	761.03	3.70	2.68	10.5	13	557	255	258	48	89	76	17.2
4	40	763.10	3.20	2.31	3.16	11	560	252	255	48	88	76	17.2
3	42.5	765.30	3.45	2.48	5.33	11	562	250	260	48	88	77	17.2
2	45	767.56	3.50	2.53	7.54	11	555	245	263	48	89	77	17.2
1	47.5	769.73	3.25	2.34	9.66	11	560	244	258	48	90	77	17.3
E-5	50	771.93	3.50	2.53	1.86	11	560	248	255	48	90	77	17.3
4	52.5	774.30	4.45	3.21	4.34	15	559	245	252	49	88	78	17.4
3	55	776.92	4.60	3.32	6.86	16	558	250	253	49	88	78	17.4
2	57.5	779.30	4.50	3.24	9.35	16	559	252	255	49	87	78	17.3
1	60	781.66	4.65	3.08	1.68	16	560	248	252	49	86	78	17.3
	62.5	784.04	4.50	3.24	4.17	16	557	245	250	49	86	78	17.4
Σ = 50.94							Avg = 79.3						
θ = 62.5													

S-0037R

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cyprus / Silver Bay, MN Date 5-15-94 Test 0 Run 3
Source Waste Gas Unit / Inlet No. of traverse points 25
Method 5 Filter holder: S-S Filter type: S.S. Thimble
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.01 cfm at 12 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

36

Recovery solvent(s)

☐ acetone
☒ other(s) MeCl₂

No. of probe wash bottles:

Sample recovered by:

1
M. Koehler + E. J. Jery

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	<u>538</u>	<u>495</u>	<u>43</u>
Impinger No. 3			
Condenser			
Desiccant	<u>1448</u>	<u>1433</u>	<u>15</u>
Total			<u>58</u>

Integrated Gas Sampling Data: NA / Trailer

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: 5

123093-GASTACK\WP\METHODS\IS-0046RR

Job Cypress / Silver Bay, Nov
Source White Oak Unit / Intel
Data 5-15-94 B Run

Operator Mr. Kochert F. J. Jr.
 Meter Box No. KHP 1.95 IN DC
 Counter Cost. 16 9971

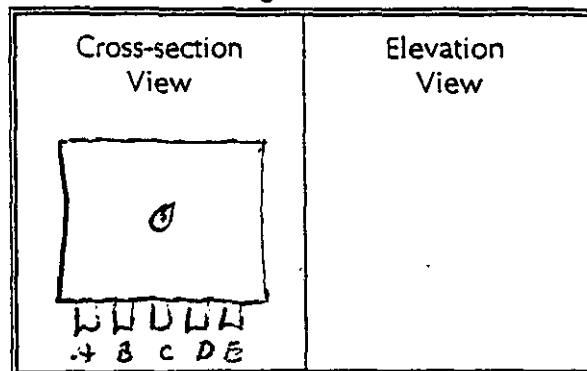
Pilot No. 27V-10 Cp 84
Bar. Press. 28.92 inHg H2O 5.5 x
Nozzle No. 5-3 Nozzle Dia .178 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWG)	Orifice Meter (inWG)	Dis. Vol. (cf)	VAD. (inHg)	Temperature (°F)					Oxygen (%)	
							Stack	Probe	Dry	Wet	Gas In		Gas Out
A-5	12.55	785.20	2.10	2.10	7.10	9	558	243	253	48	76	76	17.0
4	5	787.18	2.80	2.01	9.15	9.5	560	247	258	48	77	76	17.0
3	7.5	791.03	2.65	1.91	10.6	9	557	250	264	48	79	76	17.1
2	10	792.78	2.20	1.59	2.79	7	559	252	261	48	81	76	17.1
1	12.5	794.49	2.10	1.52	4.50	7	560	249	252	50	83	76	17.1
B-5	15	795.95	1.45	1.05	5.91	6	560	245	259	50	84	25	17.1
4	17.5	797.56	1.75	1.27	7.47	6	560	246	260	50	86	25	17.1
3	20	799.85	1.25	.91	8.79	5	559	250	253	51	88	76	17.0
2	22.5	800.30	1.50	1.09	0.64	5	560	251	255	51	89	76	17.0
1	25	801.56	1.00	.73	1.43	5	558	253	260	51	90	76	17.1
C-5	27.5	803.37	2.60	1.89	3.34	8	560	255	261	50	90	76	17.0
4	30	805.38	2.90	2.11	5.35	9	560	250	264	50	91	76	17.0
3	32.5	807.29	2.50	1.82	7.22	8.5	560	247	260	48	91	76	17.1
2	35	809.19	3.00	2.19	9.27	10	556	245	261	47	91	77	17.2
1	37.5	811.24	2.65	1.93	1.20	9.5	562	242	258	47	92	77	17.1
D-5	40	813.11	2.75	2.00	3.16	9.5	565	246	258	47	90	77	17.1
4	42.5	815.10	2.80	2.02	5.14	9.5	568	248	253	47	91	78	17.2
3	45	817.07	2.75	1.99	7.10	9.5	567	253	250	47	91	78	17.2
2	47.5	819.03	2.70	1.96	9.04	9.5	568	253	253	47	92	78	17.2
1	50	821.12	3.25	2.36	1.17	11	566	250	256	48	92	78	17.3
E-5	52.5	823.40	3.65	2.65	3.43	13	565	249	259	49	90	79	17.3
4	55	825.63	3.60	2.62	5.67	13	564	245	253	49	90	79	17.4
3	57.5	827.92	3.20	2.70	7.95	14	561	246	255	48	89	79	17.3
2	60	830.25	3.90	2.83	9.48	15	565	244	255	48	89	79	17.4
1	62.5	832.49	3.50	2.54	2.48	13	564	247	254	48	88	79	17.4
Σ = 47.25 Σ = 41.5 Σ = 1.91 Σ = 0.21 Σ = 0.21													

INTERPOLL LABORATORIES, INC.
(612) 786-6020
EPA Method 2 Field Data Sheet

Drawing of Test Site

Job Cypress / Silver Bay, MN
Source Waste Gas Unit / Filter
Test 9 Run 0 Date 5-25-94
Stack Dimen. 92 X 92 IN.
Dry Bulb 55.0 °F Wet bulb 14.0 °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 29.92 IN.HG
Static Pressure +1.35 IN.WC
Operators Miller, J. & D. Morse
Pitot No. 22V-10 C_p 34



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: <u>17.0</u> IN.	Time Start: <u>0900</u> HRS		
A-1		<u>9.20</u>	<u>26.20</u>	<u>1.40</u>	
2		<u>27.60</u>	<u>44.60</u>	<u>1.55</u>	
3		<u>46.00</u>	<u>63.00</u>	<u>2.25</u>	
4		<u>64.40</u>	<u>81.40</u>	<u>2.30</u>	
5		<u>92.80</u>	<u>99.80</u>	<u>2.85</u>	
B-1				<u>2.00</u>	
2				<u>3.95</u>	<u>A</u>
3				<u>4.00</u>	
4				<u>4.15</u>	<u>550</u>
5				<u>4.20</u>	<u>↓</u>
C-1				<u>4.25</u>	
2				<u>4.00</u>	
3				<u>3.90</u>	
4				<u>4.00</u>	
5				<u>4.15</u>	
D-1				<u>3.10</u>	
2				<u>3.75</u>	
3				<u>3.50</u>	
4				<u>3.20</u>	
5				<u>3.00</u>	
E-1				<u>2.50</u>	
2				<u>2.75</u>	
3				<u>2.80</u>	
4				<u>3.00</u>	
5				<u>3.10</u>	
Temp. Meas. Device & S/N: <u>PDT-28/TC</u>				Time End: <u>0912</u> HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress / Silver Bay, mnd Date 5-25-94 Test 9 Run 1
Source Waste Gas Unit / Inlet No. of traverse points 25
Method 5 Filter holder: S.S. Filter type: S.S. Thimble
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.02 cfm at 15 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

24

Recovery solvent(s)

☒ Acetone _____
☐ Other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
M. Kaehler & D. Marusso

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser	<u>40</u>	<u>0</u>	<u>40</u>
Desiccant	<u>1405</u>	<u>1364</u>	<u>41</u>
Total			<u>81</u>

Integrated Gas Sampling Data: NA / Trailer

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

123093-GASTACKIWPAMETHODSIS-0046RR

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Cypress / Silver Bay, WA
 Survey 588-49 Gas Port 19 / Outlet
 Date 5-88-49 Gas Port 19 / Outlet

Operator Mike Schuler & E. J. Jers
 Meter Box No. 16
 Gas Meter No. 9971

Pilot No. 270-10
 Bar. Press. 28.92
 Nozzle Dia. 1/80

CF 294

Transfer Point No.	Sampling Time (min)	Sample Volume (cc)	Velocity Hood (inHG)	Orifice Meter (inHG)	Des. Vol. (cc)	VAC. inHg	Temperature (°F)				Oxygen (xv/v)		
							Stack	Probe	Dry	Wet			
A-5	1430	833.10	2.35	1.70	4.90	7	563	243	248	48	79	78	16.6
	2.5	934.87	2.55	1.82	6.76	7	564	247	249	48	02	78	16.6
	5	936.72	2.55	1.82	6.76	7	564	247	249	48	02	78	16.6
	7.5	838.65	2.40	1.72	8.59	7	565	245	258	46	97	77	16.8
	10	840.43	2.30	1.66	0.36	7	565	242	255	46	88	77	16.7
B-5	12.5	842.31	2.65	1.91	2.28	8	562	244	252	46	89	77	16.7
	15	844.13	2.35	1.70	4.08	7	564	247	260	46	97	77	16.7
	17.5	845.99	2.55	1.85	5.97	7	556	250	261	46	90	77	16.7
	20	847.80	2.20	1.60	7.73	6.5	555	253	263	46	91	78	16.8
	22.5	849.54	2.30	1.67	9.52	7	558	251	260	47	92	78	16.7
C-5	25	851.41	2.45	1.78	1.38	7	559	255	257	46	92	78	16.7
	27.5	853.73	3.90	2.83	3.71	11	554	252	252	47	91	78	16.8
	30	856.00	3.75	2.72	6.00	11	560	249	259	47	92	78	16.8
	32.5	857.88	2.50	1.81	7.87	7	562	256	248	47	92	79	16.9
	35	859.85	2.70	1.96	9.82	7.5	560	255	253	49	92	79	16.9
D-5	37.5	861.78	3.00	2.19	1.88	8.5	554	255	257	49	93	79	16.9
	40	864.37	4.50	3.27	4.38	13	560	252	255	49	92	79	16.9
	42.5	866.80	4.30	3.12	6.83	13	561	253	251	49	92	79	17.0
	45	869.24	4.25	3.10	9.28	13	555	250	254	49	92	80	16.9
	47.5	871.12	2.50	1.84	1.16	7.5	550	254	253	50	91	80	17.0
E-5	50	873.11	2.75	2.03	3.14	8	546	251	255	50	92	80	16.9
	52.5	875.40	3.70	2.72	5.43	11	548	247	256	50	92	80	16.9
	55	877.65	3.80	2.80	7.75	11	545	250	253	52	93	80	16.9
	57.5	879.90	3.40	2.51	9.95	10	548	252	259	52	93	80	17.0
	60	882.00	3.05	2.26	2.04	10	545	253	258	52	92	81	17.0
1	62.5	883.87	2.50	1.85	3.93	8	545	251	260	52	93	81	17.0
Avg. = 50.77							Avg. = 80.8				Avg. = 80.8		

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress / Silver Bay, MN Date 5-25-94 Test 9 Run 2
Source White Gas Vent / Inlet No. of traverse points 25
Method 5 Filter holder: S.S. Filter type: S.S. Thimble
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.02 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

28

Recovery solvent(s)

☒ Acetone _____
☐ Other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
M. Kuchelau + D. Mariss

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser	<u>40</u>	<u>0</u>	<u>40</u>
Desiccant	<u>1404</u>	<u>1448</u>	<u>36</u>
Total			<u>34</u>

Integrated Gas Sampling Data: NA / Trailer

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet:

5

INTERPOL. LABORATORIES EPA METHOD 5 FIELD DATA SHEET

0001	Cypress / Silver Bay, fl. 14	
0002	Superior Waste Gas Unit	Inlet
0003	5-25-94	1991 9 Nov 2

Operator McKewen + D. H. 158
 Motor Box No. 76 588 1.95 IN NC
 Counter cost. 1992

Pilot No. 70-0 CP 65
 Reg. Price. \$892 HSD 74 x
 Motor No. 53 HDZLN 0.4.80

[illegible]

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress / Silver Bay, 414V Date 5-25-94 Test 9 Run 3
Source Waste Gas Unit No. of traverse points 25
Method 5 Filter holder: 5-5 Filter type: 5-5 Thimble
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: _____ cfm at _____ in. Hg. (vac) ☐

Particulate Catch Data:

No. of filters used:

Recovery solvent(s)

26
41,2300

☒ Acetone _____
☐ Other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
McKuehler + D. Maroso

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2			
Impinger No. 3			
Condenser	46	0	46
Desiccant	1441	1402	39
Total			85

Integrated Gas Sampling Data: NA / Ambient Trailer

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: 5

123093-GASTACKWPMETHODSIS-0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Sub Expense / Silver River Inn
 Supplier White Gas Unit / Toilet
 Date 5-15-44 1951 9 Nov 2

Operator Askegatan & D. Marston
 Water Box No. SN 195 IN DE
 Generator cost. 997

Pilot No. 270-10 Ep 24
 Bar. Press. 28.42 1019 420 27 X
 Nozzle No. 5-3 Nozzle Dia. 1.32 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cfs)	Velocity Head (ft)	Orifice Meter (ft)	Obs. Vel. (ft)	VAC. In/Hg	Temperature (°F)						Dry Bulb (°F)
							Stack	Probe	Duct	Impy.	Gas In	Gas/Duct	
A-5	172.5	935.20	2.20	1.99	7.16	5.5	554	247	254	48	85	83	172.1
4	2.5	937.15	2.20	1.87	2.06	5.5	555	242	257	48	70	83	16.8
3	7.5	940.85	2.50	1.77	0.91	5	557	246	259	48	91	82	16.8
2	10	942.62	2.25	1.60	2.66	5	554	246	254	48	93	82	16.9
1	12.5	944.50	2.60	1.85	4.56	5.5	550	249	257	47	94	82	16.5
B-5	15	946.63	2.85	1.04	6.55	6	547	253	259	47	95	82	16.9
4	17.5	948.65	3.10	2.22	8.62	6.5	549	250	256	47	95	82	16.4
3	10	950.75	3.25	2.33	0.75	7	547	254	256	48	96	82	16.8
2	12.5	952.42	1.90	1.37	2.38	8	545	255	261	48	96	82	16.9
1	15	953.97	1.70	1.22	3.92	14	548	251	258	48	46	83	16.9
C-5	27.5	956.15	3.75	2.68	6.20	7.5	549	250	249	49	46	83	16.8
4	30	958.50	4.00	2.86	8.56	9	549	253	245	49	47	83	17.0
3	32.5	960.67	4.10	2.93	0.94	9	550	255	250	47	47	83	17.0
2	35	963.00	3.15	2.25	3.03	7	554	255	254	47	97	83	17.1
1	37.5	965.11	3.25	2.32	5.16	7	555	257	251	47	97	83	17.0
D-5	40	967.47	4.10	2.92	2.54	8.5	555	254	247	48	76	84	16.9
4	42.5	969.86	4.25	3.03	9.96	9	553	250	252	48	47	84	17.0
3	45	972.37	4.40	3.14	2.43	10	553	253	249	48	97	84	17.0
2	47.5	974.85	4.50	3.21	4.93	10	552	250	249	50	97	84	17.0
1	50	977.10	3.60	2.58	7.17	8	550	252	248	49	97	84	17.0
E-5	52.5	979.31	3.50	2.52	9.38	8	547	251	250	49	95	84	17.0
4	55	981.56	3.55	2.54	1.60	8	555	253	256	51	97	84	17.0
3	57.5	983.75	3.40	2.43	3.77	8	552	253	255	52	97	84	17.0
2	60	985.90	3.60	2.58	6.01	8	549	254	250	52	98	85	17.0
1	67.5	988.00	3.10	2.23	8.10	9	550	254	250	52	98	85	17.0

INTERPOL LABORATORIES, INC.
(612) 786-6020
EPA Method 2 Field Data Sheet

Drawing of Test Site

Job CYPRESS NORTH SHIRE MINING
Source NO. 1204 waste rock dump
Test 10 Run 0 Date 5-25-94
Stack Dimen. 71.5 IN.
Dry Bulb °F Wet bulb °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 28.92 IN.HG
Static Pressure -.25 IN.WC
Operators E. THOMPSON - D. VALLER
Pitot No. 23V-6 C_p 1.940

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: <u>1 1/2</u> IN.	Time Start: _____ HRS		
A-1	.1021	1.50	6.00	.65	
2	.067	4.79	9.29	.70	
3	.118	8.44	12.94	.82	
4	.177	12.66	17.16	.90	
5	.250	17.88	22.38	.94	
6	.356	25.45	29.95	.92	
7	.644	46.05	50.55	.88	
8	.750	53.62	58.12	.80	
9	.823	58.84	63.34	.68	
10	.882	63.06	67.56	.58	
11	.933	66.71	71.21	.57	
12	.979	69.99	74.50	.59	
B-1				.58	
2				.64	
3				.71	
4				.80	
5				.87	
6				.89	
7				.87	
8				.85	
9				.74	
10				.69	
11				.66	
12				.62	
Temp. Meas. Device & S/N: <u>PDT-34</u>				Time End: _____ HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CYPRUS Date 5-25-94 Test Run 1
Source NO 1204 WASTE GAS STACK No. of traverse points 24
Method 5 Filter holder: 4" GLASS Filter type: 4" GLASS FIBER
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 12 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

6572

Recovery solvent(s)

☒ Acetone
☐ Other(s)

No. of probe wash bottles:

Sample recovered by:

1
ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		<u>100</u>	
Impinger No. 2	<u>410</u>	<u>100</u>	<u>210</u>
Impinger No. 3		<u>0</u>	
Condenser			
Desiccant	<u>1475</u>	<u>1450</u>	<u>25</u>
Total			<u>235</u>

Integrated Gas Sampling Data:

Bag Pump No. 238
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: _____
Sampling rate: 400

Box No. _____ Bag No. 1
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: ET

S/N of O₂ Analyzer used to monitor train outlet: _____

123093-GASTACKIWP\METHODS\IS-0046RR

with Ciphers

5001064 11/13/04 WASTE GAS STALK 1
5001064 5-25-94 101 101 1

[illegible]

ET-28

2011-12-28

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044 10

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5441
28-1-47

11-27-02

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CVPPLS Date 5-25-94 Test 10 Run 3
Source ND1204 WASTE GAS STACK No. of traverse points 24
Method J Filter holder: 4" GLASS Filter type: 4" GLASS FIBER
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) A
Post test: 0 cfm at 9 in. Hg. (vac) X

Particulate Catch Data:

No. of filters used:

5620

Recovery solvent(s)

☒ Acetone _____
☐ Other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	<u>400</u>	<u>{ 100 }</u>	<u>200</u>
Impinger No. 3		<u>{ 0 }</u>	
Condenser			
Desiccant	<u>1382</u>	<u>1361</u>	<u>11</u>
Total			<u>211</u>

Integrated Gas Sampling Data:

Bag Pump No. 236
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: _____
Sampling rate: 400

Box No. _____ Bag No. 2
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: ET

S/N of O₂ Analyzer used to monitor train outlet: _____

123093-GASTACK\WPMETHODS\IS-0046RR

[illegible]

जगद्विषयस्य

67-21

Pt No.	23V-6	Cy	846
Bat.	2892	1114	112D
Horizl No.	7-4	1112H	D 11, 248

[illegible]

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CYPRUS Date 5-25-94 Test 10 Run 5
Source NO 1204 WASTE GAS STACK No. of traverse points 24
Method 5 Filter holder: 4" GLASS Filter type: 4" GLASS FIBER
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 9 cfm at 9 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

5621

Recovery solvent(s)

☒ Acetone
☐ other(s)

No. of probe wash bottles:

Sample recovered by:

1
ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		{ 100 } 100 0	
Impinger No. 2			
Impinger No. 3			208
Condenser			
Desiccant	1490	1475	15
Total			223

Integrated Gas Sampling Data:

Bag Pump No. 238
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start:
Sampling rate: 400

Box No. Bag No. 3
Size: 44 L
cc/min at 15 in. Hg.
(HRS) Time end: (HRS)
cc/min Operator: ET

S/N of O₂ Analyzer used to monitor train outlet:

123093-G:STACK\WPMETHODS\5-0046RR

4100
4000
3900
3800
3700
3600
3500
3400
3300
3200
3100
3000
2900
2800
2700
2600
2500
2400
2300
2200
2100
2000
1900
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0

100100 CY/HR
 100100 NO 1204 AIRBOR GAS STACK
 100100 5-25-94 1001 10 NOV 93

[illegible]

2866
7 11 11
✓ 10-13

2011-12

Plot No. 236-6
 Date. 28.
 No. 7-4

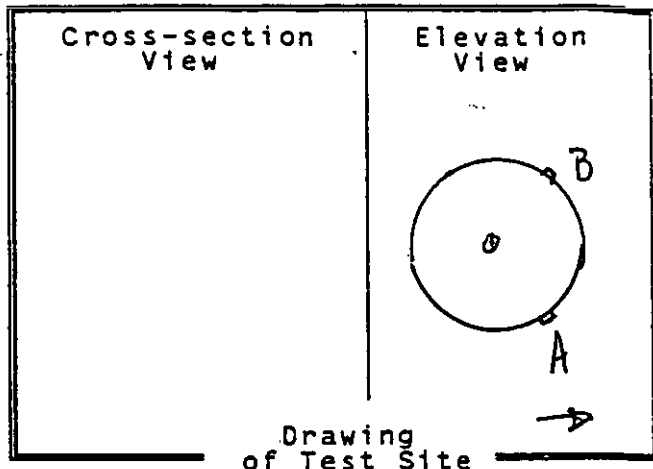
$\begin{array}{r} 100 \\ \times 840 \\ \hline 400 \\ 8000 \\ \hline 84000 \end{array}$

Invertebrate Point No.	Sampling Time (min)	Sample Volume (cc)	Velocity Head (inHg)	Orifice Meter (inHg)	Obs. Vol. (cc)	VAC. inHg	Temperature (°F)					Dissolved Oxygen (mg/l)
							Stock	Probe	Open	Temp.	Gas In	
B	12	527.50	1.48	1.77	9.42	✓	140	232	249	79	78	
	11	529.44	1.66	1.70	1.29	✓	140			82	78	
	10	531.30	1.60	1.55	3.08	✓	140	242	257	83	78	
	9	533.14	1.72	1.86	5.04	✓	140			85	78	
	8	535.08	1.88	2.28	7.21	✓	140	252	258	87	78	
	7	537.23	1.93	2.41	9.45	✓	140			88	78	
	6	539.45	1.85	2.21	1.59	✓	140	255	256	88	78	
	5	541.62	1.90	2.33	3.79	✓	140			89	78	
	4	543.83	1.78	2.03	5.84	✓	140	254	258	90	79	
	3	545.90	1.70	1.82	7.79	✓	140			90	79	
A	2	547.80	1.68	1.77	9.71	✓	140	250	260	91	79	
	1	549.72	1.65	1.69	1.59	✓	140			92	79	
	12	551.59	1.54	1.41	3.31	✓	140	253	258	92	79	
	11	553.32	1.56	1.46	5.06	✓	140			92	79	
	10	555.05	1.60	1.57	6.87	✓	140	256	261	93	80	
	9	556.88	1.65	1.70	8.75	✓	140			93	80	
	8	558.75	1.70	1.83	0.71	✓	140	254	260	94	80	
	7	560.72	1.75	1.96	2.73	✓	140			94	80	
	6	562.75	1.68	1.78	4.66	✓	140	254	262	94	80	
	5	564.65	1.90	2.35	6.88	✓	140			94	80	
	4	566.88	1.86	2.25	9.05	✓	140	252	260	94	81	
	3	569.04	1.90	2.09	1.14	✓	140			94	81	
	2	571.14	1.70	1.83	3.10	✓	140	247	255	94	81	
	1	573.14	1.62	1.62	4.95	✓	140			94	81	
		574.95				✓	140			94	82	
Σ = 40							Avg = 84.7					

NS-0037R

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job Cyprus
 Source NO 1205 WASTE GAS STACK
 Test 11 Run Date 5/24/94
 Stack dimen. 71 1/2 IN.
 Dry bulb °F Wet bulb °F
 Manometer: ☒ Reg. ☐ Exp. ☐ Elec.
 Barometric pressure 28.92 in Hg
 Static pressure -.28 in WC
 Operators D. Van Hoever & D. Vaaler
 Pitot No. 4m5-6 C, .84



Traverse Point No.	Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
		Port length: <u>4 1/2</u> in.		Time start: <u> </u> hrs	
A 1	.021	1.50	6.0	.40	
2	.067	4.79	9.29	.52	
3	.118	8.44	12.93	.63	
4	.177	12.66	17.16	.73	
5	.25	17.88	22.38	.82	
6	.356	25.45	29.95	.82	132
7	.644	46.05	50.55	.86	
8	.75	53.62	58.12	.81	
9	.823	58.84	63.34	.74	
10	.882	63.06	67.56	.68	
11	.939	66.71	71.21	.66	
12	.979	69.99	74.50	.62	
B 1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Temp. meas. device & S/N: <u>PDT #35</u>				Time end: <u> </u> hrs	

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job Cypius Date 5/25/91 Test 11 Run 1
 Source NO 1265 WASTE GAS STACK No. of traverse points 24
 Method 529 Filter holder: teflon Filter type: pullflex

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☐
 Posttest: 0 cfm at 16 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: _____ Recovery solvent(s) _____
 _____ ☐ acetone
 _____ ☒ other(s) LiAlH₄ & MeCl₂
 No. of probe wash bottles: 2
 Sample recovered by: Dvd

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		} 400	
Impinger No. 2	601		201
Impinger No. 3			
Condenser			
Desiccant	1426	1404	22
Total			223

Integrated Gas Sampling Data:

Bag Pump No. 23B Box No. 24 Bag No. 1
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 14 in. Hg.
 Time start: 0930 (HRS) Time end: 1028 (HRS)
 Sampling rate: 400 cc/min Operator: DVH
 S/N of O₂ Analyzer used to monitor train outlet: 8

CF-023

Job	Cyrus				
Estimate No	1205	Waste	603	Stack	
Date	5/28/94		11	Run	1

Operator DUT & DV
Meter Box No. 3 HP 1.80 IN NC
Computer Cost. 9983

Pilot No. 4m5-6 Cy. 8x
Bar. Press. 28.92 inHg H2O 15" x
NDI 114 ND 114 DIA. 2 1/2 in.

[illegible]

INTERPOL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job Cyprus Date 5/25/94 Test 11 Run 2
 Source NO 1705 WASTE GAS STACK No. of traverse points 24
 Method 29 Filter holder: tetlon Filter type: pullflex

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 15 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: Recovery solvent(s)

☐ acetone
☒ other(s) IN HNO₃ + MCL₂

No. of probe wash bottles: 2
 Sample recovered by: DUT

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		3400	
Impinger No. 2	591		191
Impinger No. 3			
Condenser			
Desiccant			19
Total			210

Integrated Gas Sampling Data:

Bag Pump No. 23B Box No. 24 Bag No. 2
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 14 in. Hg.
 Time start: 1115 (HRS) Time end: 1211 (HRS)
 Sampling rate: 400 cc/min Operator: DUT
 S/N of O₂ Analyzer used to monitor train outlet: 8

CF-023

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Cyprus

Source 1205 WASTE GAS STACK

Date 5/25/84

Operator DUN & J

Motor Box No. 3

Compressor Conf. 9883

Pilot No. 4ms-6

CP 94

Bur. Press. 28.92

InHg H2O 18.5

Nozzle Dia. 248

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inHg)	Drifts Motor (inHg)	Des. Vol. (cf)	VAC. inHg	Temperature (°F)				Gas/In	Gas/Out	Oxygen (xv/v)
							Stack	Probe	Oven	Ingh.			
B 12	11.0	662.70	1.60	1.60	452	9	137	261	254	49	75	75	17.3
B 11	2.5	664.53	1.62	1.63	635	9	137				78	76	17.3
B 10	5	666.45	1.68	1.79	827	10	138				79	76	17.3
B 9	7.5	668.28	1.77	2.03	031	12	138	264	254	48	81	77	17.3
B 8	10	670.42	1.84	2.22	146	12	138				82	77	17.3
B 7	12.5	672.57	1.87	2.31	463	12	138				82	78	17.4
B 6	15	674.68	1.86	2.28	680	12	138	264	257	49	82	78	17.4
B 5	17.5	676.87	1.85	2.26	896	12	137				82	77	17.4
B 4	20	678.99	1.81	2.15	107	12	137				82	77	17.4
B 3	22.5	681.07	1.73	1.94	307	11	137	267	256	50	82	77	17.3
B 2	25	683.11	1.66	1.75	497	10	138				83	78	17.3
B 1	27.5	685.00	1.56	1.49	673	8	138				83	78	17.3
A 12	30	686.75	1.65	1.73	862	10	138	264	257	51	81	78	17.4
A 11	32.5	688.70	1.68	1.80	054	10	138				85	78	17.3
A 10	35	690.63	1.73	1.94	255	11	138				86	78	17.3
A 9	37.5	692.58	1.78	2.08	463	11	138	265	258	52	86	79	17.3
A 8	40	694.60	1.86	2.29	680	12	138				86	79	17.3
A 7	42.5	696.77	1.84	2.24	896	12	138				85	79	17.4
A 6	45	698.97	1.84	2.24	112	12	138	263	260	52	85	79	17.4
A 5	47.5	701.17	1.82	2.18	325	12	138				85	79	17.4
A 4	50	703.38	1.72	1.92	524	11	138				85	79	17.3
A 3	52.5	705.40	1.63	1.68	711	10	138	261	258	52	85	79	17.4
A 2	55	707.90	1.50	1.33	877	8	138				85	79	17.3
A 1	57.5	708.90	1.49	1.31	042	8	138				85	79	17.3
	60	710.41									85	79	17.3
	(1211)												
		V _s = 47.71		ΔH = 4.93							AVG. = 82.4		
		θ = 60											

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job Cyprus Date 5/25/94 Test 11 Run 3
 Source NO 1205 WASTE GAS STACK No. of traverse points 24
 Method 29 Filter holder: teflon Filter type: pal/flex

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 14 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: _____ Recovery solvent(s) _____
 _____ ☐ acetone
 _____ ☒ other(s) MEL₂ & INHNO₃
 No. of probe wash bottles: 2
 Sample recovered by: DUH

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		} 400	
Impinger No. 2	598		198
Impinger No. 3			
Condenser			
Desiccant	1419	1405	14
Total			212

Integrated Gas Sampling Data:

Bag Pump No. 23B Box No. 24 Bag No. 3
 Bag Material: 5-layer Aluminized Tedlar Size: 44 L
 Pretest leak check: 0 cc/min at 14 in. Hg.
 Time start: 1300 (HRS) Time end: 1957 (HRS)
 Sampling rate: 400 cc/min Operator: DUH
 S/N of O₂ Analyzer used to monitor train outlet: 8

CF-023

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Cyprus Source 140 1205 WASTE GAS STACK Date 5/25/94 Test 11 Run 3

Operator DUN #D.V Pitot No. 4MS-6 Cp .84
 Meter Box No. 3 XRA 1.80 IN HC Bar. Press. 28.82 IN Hg H2O 78 K
 Gasometer coeff. 1.00 Nozzle No. 6255 Nozzle Dia 2.82 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (in H ₂ O)	Drifts Meter (in H ₂ O)	Des. Vol. (cf)	VAC. in Hg	Temperature (°F)				Stack	Probe	Duct	Inlet	Gas/Out	Oxygen (xv/v)
A 12	12.5	710.60	.62	1.66	2.45	8					138	257	246	75	75	17.3
11	5	712.46	.62	1.65	4.29	8					137			78	76	17.2
10	7.5	714.31	.61	1.84	6.24	8					137			80	76	17.2
9	10	716.24	.80	2.14	8.33	11					137	261	253	81	77	17.3
8	12.5	718.17	.86	2.30	0.51	12					137			82	77	17.3
7	15	720.50	.86	2.31	2.69	12					137			83	78	17.4
6	17.5	722.61	.83	2.23	4.84	12					137	261	254	83	78	17.3
5	20	724.76	.79	2.12	6.93	11					137			83	78	17.3
4	22.5	726.85	.71	1.91	8.92	10					137			84	78	17.2
3	25	728.96	.62	1.67	0.78	9					137	260	257	84	78	17.2
2	27.5	730.90	.53	1.43	2.50	8					137			84	78	17.2
1	30	732.61	.52	1.40	4.20	8					137			86	79	17.1
B 12	32.5	734.20	.61	1.65	6.05	9					137	261	258	86	79	17.1
11	35	736.23	.63	1.69	7.92	9					140			88	80	17.1
10	37.5	737.99	.69	1.86	9.89	10					140			88	80	17.2
9	40	739.93	.74	1.99	1.93	11					140	264	260	89	81	17.1
8	42.5	741.99	.81	2.18	4.06	11					140			89	81	17.1
7	45	744.04	.83	2.24	6.22	12					140			89	81	17.3
6	47.5	746.12	.81	2.18	8.35	12					140	260	257	89	81	17.3
5	50	748.29	.81	2.18	0.48	12					140			88	81	17.3
4	52.5	750.49	.83	2.24	2.64	12					140	262	258	88	81	17.2
3	55	752.67	.76	2.05	4.70	11					140			88	81	17.3
2	57.5	754.80	.68	1.83	6.66	11					140	260	257	88	82	17.2
1	60	756.84	.57	1.54	8.45	10					140			89	82	17.2
	60	758.46														
	13.57															
	θ =	V ₀ = 47.86		ΔH = 1.93											Av _g = 82	

INTERPOLL LABORATORIES, INC.
(612) 786-6020
EPA Method 2 Field Data Sheet

Drawing of Test Site

Job CIPRUS
 Source No 1204 West Gas Street
 Test 12 Run 0 Date 5-25-84
 Stack Dimen. 21.5 IN.
 Dry Bulb °F Wet bulb °F
 Manometer ☒ Reg. ☐ Exp ☐ Elec.
 Barometric Pressure 28.92 IN.HG
 Static Pressure - .25 IN.WC
 Operators ET-DV
 Pitot No. 23V-6 C_p .840

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length:	IN.	Time Start:	HRS
Temp. Meas. Device & S/N:				Time End:	HRS

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CIPRAUS Date 5-25-84 Test 12 Run 1
Source NO 1304 North Ave Steek No. of traverse points 24
Method 5 Filter holder: 4" GLASS Filter type: 4" GLASS FIBER
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 9 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

5622

Recovery solvent(s)

☒ acetone
☐ other(s)

No. of probe wash bottles:

Sample recovered by:

1
ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		<u>100</u>	
Impinger No. 2	<u>398</u>	<u>100</u>	<u>198</u>
Impinger No. 3		<u>0</u>	
Condenser			
Desiccant	<u>1409</u>	<u>1382</u>	<u>27</u>
Total			<u>225</u>

Integrated Gas Sampling Data:

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

1901

P. 1017. No. 234-6 C. 184
 B. 1017. No. 234-6 C. 184
 B. 1017. No. 234-6 C. 184

[illegible]

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CVPRUS Date 5-25-85 Test 12 Run 2
Source NO 1204 Waste Water Stack No. of traverse points 24
Method 5 Filter holder: 4" Glass Filter type: 4" Glass Filter
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: _____ cfm at _____ in. Hg. (vac) ☐

Particulate Catch Data:

No. of filters used:

5623

Recovery solvent(s)

☒ acetone _____
☐ other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		<u>1100</u>	
Impinger No. 2	<u>411</u>	<u>100</u>	<u>211</u>
Impinger No. 3		<u>0</u>	
Condenser			
Desiccant	<u>1510</u>	<u>1490</u>	<u>20</u>
Total			<u>231</u>

Integrated Gas Sampling Data:

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

123093-GASTACK\WPMETHODS\0046RR

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job CYPRUS Date 2-25-84 Time 10:12 Run 2
 Source NO 204 WAC Operator ET-DV
 Date 2-25-84 Meter Box No. 11 Mile 1.80 IN MC
 Gas meter count. 19980
 Pilot No. 331-C CP 184
 Bar. Press. 29.92 inHg 1120
 Nozzle No. 7-2 Nozzle Dia. 2.08 in.

Transfer Point No.	Sampling Time (min)	Sample Volume (cc)	Velocity Head (inHg)	Drifts Meter (inHg)	Obs. Vol. (cc)	VAC. inHg	Temperature (°F)				Oxygen (X%)
							Stack	Probe	Oven	Inlet	
12	15.5	622.50	1.65	1.67	4.36	✓	138	248	252	84	81
11	5	624.40	1.66	1.68	6.23	✓	138			86	81
10	7.5	626.22	1.64	1.64	8.08	✓	138	253	250	87	81
9	10	628.10	1.80	2.02	0.14	✓	138			89	81
8	12.5	632.02	1.86	2.20	2.28	6	138	250	252	90	81
7	15	634.12	1.82	2.10	4.37	6	138			91	81
6	17.5	636.24	1.84	2.15	6.50	7	138	251	252	92	81
5	20	638.39	1.84	2.16	8.62	7	138			92	81
4	22.5	640.45	1.73	1.87	0.60	6	138	253	254	93	81
3	25	642.47	1.6	1.67	2.47	7	138			93	82
2	27.5	644.26	1.55	1.42	4.20	6	138	255	251	94	82
1	30	646.02	1.57	1.47	5.95	5	139			94	82
12	32.5	647.80	1.62	1.59	7.78	5	139	252	250	93	82
11	35	649.53	1.60	1.54	9.58	5	139			95	82
10	37.5	651.32	1.62	1.60	1.41	5	137	255	253	95	82
9	40	653.04	1.58	1.50	3.17	5	136			96	83
8	42.5	655.05	1.81	2.09	5.29	4	137	251	250	96	83
7	45	657.16	1.81	2.09	7.39	7	137			96	83
6	47.5	659.47	1.94	2.43	9.65	8	137	252	248	96	83
5	50	661.78	1.94	2.43	1.90	8	137			96	83
4	52.5	663.97	1.85	2.20	4.05	8	137	255	251	96	83
3	55	666.05	1.76	1.97	6.09	7	137			96	83
2	57.5	668.01	1.68	1.76	8.01	6	137	254	253	96	83
1	60	669.87	1.66	1.71	9.91	6	137			96	83
	(1700)									avg. = 87.5	

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CYPRUS
Source NO1204 Waste Water Stack
Method 5 Filter holder: 4 Glass
Sample Train Leak Check:

Date 5-25-84 Test 12 Run 3
No. of traverse points 24
Filter type: 4" Glass Fiber

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

5624

Recovery solvent(s)

☒ Acetone _____
☐ Other(s) _____

No. of probe wash bottles:

Sample recovered by:

1
ET

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1		{ 100 }	200
Impinger No. 2	400	{ 100 }	
Impinger No. 3		{ 0 }	
Condenser			
Desiccant	1430	1382	48
Total			248

Integrated Gas Sampling Data:

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

123093-GASTACK\WP\METHODS\IS-0046RR

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Saddo

5-25-94 1061 12 RUN 3

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10-11-57

20-11-2

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 2. **Prüfung**
 3. **Prüfung**

City High Div
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84

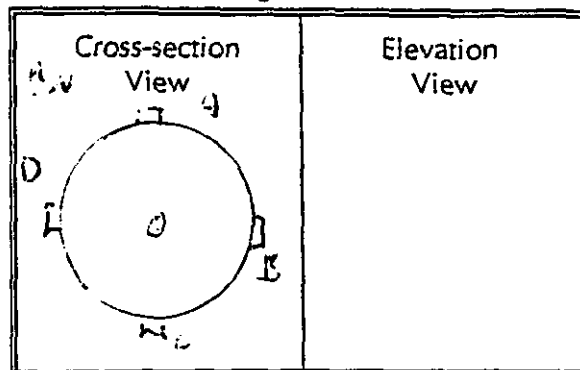
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INTERPOLL LABORATORIES, INC.
(612) 786-6020
EPA Method 2 Field Data Sheet

Drawing of Test Site

Job Copper / Silver Bay, near
Source 401104 Pelletizer / Stack
Test 15 Run Date 5-26-94
Stack Dimen. 21 IN.
Dry Bulb 140 °F Wet bulb 130 °F
Manometer ☒ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 29.46 IN.HG
Static Pressure -1.22 IN.WC
Operators M. Kachler + D. Manso
Pitot No. 224-276 C₀ 101



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: <u>5</u> IN.	Time Start: <u>0750</u> HRS		
A-1	.021	1.49	6.49	.45	
2	.067	4.76	9.76	.63	
3	.118	8.38	13.38	.95	
4	.177	12.57	17.57	1.15	140
5	.250	17.75	22.75	1.30	
6	.356	25.28	30.28	1.40	
B-1				.55	
2				.82	
3				.95	
4				1.05	
5				1.10	
6				1.15	
C-1				.50	
2				.60	
3				.97	
4				.99	140
5				1.00	
6				1.05	
D-1				.65	
2				.58	
3				.71	
4				.85	
5				.98	
6				.95	
Temp. Meas. Device & S/N: <u>PD1-2817C</u>				Time End: <u>0757</u> HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Copper / Silver Baghouse Date 5-16-94 Test 15 Run 1
Source Site 1101 Pallets / Stack No. of traverse points 25
Method 5 Filter holder: 6/425 Filter type: 4" G.I.
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.02 cfm at 12 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: 5632 Recovery solvent(s):
☒ Acetone
☐ Other(s):

No. of probe wash bottles: 1
Sample recovered by: 1315-126/20 + D. Mawer

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	625	459	166
Impinger No. 2			
Impinger No. 3			
Condenser			
Desiccant	1354	1335	19
Total			185

Integrated Gas Sampling Data: Not / Trailer

Bag Pump No. _____ Box No. _____ Bag No. _____
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: _____ cc/min at _____ in. Hg.
Time start: _____ (HRS) Time end: _____ (HRS)
Sampling rate: _____ cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: 5

123093-GASTACK\WP\METHODS\0046RR

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Cypress / Silver Bay, Calif Operator _____ Pilot No. _____ Cp 334
 Sample Abundant Pelletizer / Stack Motor Box No. _____ Bar. Press. 29.46 inHg H₂O 16.3 x
 Date 5-26-84 1984 15 Generator serial. 4480 TMC _____ Nozzle No. 6-4 Nozzle Dia. 2.72 in.

Transfer Point No.	Sampling Time (min)	Sample Volume (cfs)	Velocity Head (inHg)	Drifted Motor (inHg)	Def. Vol. (cfs)	VAC. inHg	Temperature (°F)					Gas In	Gas Out	Oxygen (xv/v)
							Stack	Probe	Dyn	App.				
A-6	0810	725.40	1.34	3.57	8.05	10	127	248	249	42	77	70	18.2	
5	5	728.01	1.30	3.75	0.78	11	122	245	249	42	79	70	18.0	
4	7.5	730.25	1.18	3.41	3.39	10	130	240	252	42	81	71	18.0	
3	10	733.29	1.09	2.55	5.66	8	137	243	256	44	83	71	18.2	
2	12.5	735.58	1.08	1.95	7.64	6.5	140	246	250	45	84	71	18.3	
1	15	737.55	1.41	1.11	9.14	5	138	250	261	40	86	72	18.3	
B-6	17.5	739.20	1.20	3.26	1.71	10	137	258	265	40	85	72	18.3	
5	20	741.66	1.17	3.17	4.24	10	139	254	263	40	88	73	18.2	
4	22.5	744.15	1.07	2.90	6.66	9.5	141	255	260	42	89	73	18.2	
3	25	746.63	1.07	2.49	8.90	8	145	250	267	42	89	74	18.2	
2	27.5	748.97	1.74	1.98	0.91	6.5	150	249	261	39	90	74	18.3	
1	30	750.87	1.53	1.44	2.63	5	144	252	264	38	90	74	18.3	
C-6	32.5	752.59	1.05	2.83	5.02	9	147	250	267	39	90	75	18.2	
5	35	755.00	1.03	2.65	7.42	9	136	247	263	39	90	75	18.2	
4	37.5	757.13	1.07	2.65	9.74	8	138	249	263	39	91	76	18.2	
3	40	759.21	1.01	2.20	16.6	7	143	245	260	40	91	76	18.2	
2	42.5	761.78	1.66	1.79	3.77	6	146	250	267	40	91	76	18.2	
1	45	763.75	1.50	1.36	5.44	5	144	254	262	41	91	77	18.3	
D-6	47.5	765.51	1.77	2.09	7.51	6.5	144	249	265	41	90	77	18.3	
5	50	767.48	1.95	2.60	9.81	8	140	252	260	42	91	77	18.3	
4	52.5	769.78	1.75	2.04	1.85	6.5	143	253	261	42	91	77	18.3	
3	55	771.00	1.67	1.80	3.77	6	150	250	260	42	91	77	18.3	
2	57.5	773.77	1.61	1.64	5.61	6	151	255	260	42	91	78	18.3	
1	60	775.57	1.61	1.65	7.44	6	149	255	257	42	91	78	18.3	

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Copperville / Sullivan County, Tenn Date 5-16-74 Test 15 Run 7
Source 1104 Polluter, 15 mi No. of traverse points 24
Method 5 Filter holder: Glass Filter type: 4" G.F.
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.02 cfm at 12 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

5633

Recovery solvent(s)

☒ Acetone
☐ Other(s)

No. of probe wash bottles:

Sample recovered by:

1
to 1104 Polluter, 1 D. Mass. SO

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	639	469	170
Impinger No. 3			
Condenser			
Desiccant	1439	1422	17 ~~97~~
Total			197

Integrated Gas Sampling Data: 114 / Truile

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: 5

123093-GASTACKWPMETHODSIS-0046RR

Sub Cypress / S. Lucia Island
 Supr 1101 Pfeiffer / Stack
 Date 5-20-54 / 1061 / Run 2

[illegible]

Pilot No. 22V-214 CP 151
Bar. Press. 25.96 inHg H2O 2.6 in.
Horiz. No. 6-2 Horiz. Dia. 2.1 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cc)	Velocity Head (in H ₂ O)	Orifice Meter (in H ₂ O)	Det. Vol. (cc)	VAC. in Hg	Temperature (°F)						Oxygen (xv/v)
							Stack	Probe	Duct	Inpy.	Gas In	Gas/Duct	
D-6	0455	772.60	1.97	2.62	9.92	8	147	245	260	41	75	76	18.2
5	2.5	779.85	1.85	2.31	3.08	7.5	148	250	265	41	78	75	18.1
4	7.5	781.05	1.72	1.97	4.01	6.5	145	252	267	41	80	75	18.1
3	10	785.45	1.64	1.76	5.96	6	145	253	263	41	82	75	18.2
2	12.5	787.85	1.53	1.51	7.89	5.5	146	255	260	42	84	75	18.2
1	15	789.41	1.47	1.23	9.37	5	153	257	260	42	85	75	18.2
D-6	12.5	791.78	1.03	2.81	1.75	9	152	250	262	42	86	75	18.2
5	10	794.17	1.01	2.80	4.13	9	142	252	258	42	87	75	18.3
4	12.5	796.35	1.87	2.17	6.37	8	143	248	261	40	88	75	18.3
3	15	798.34	1.74	2.03	8.40	7	149	249	264	40	88	75	18.2
2	17.5	800.24	1.61	1.68	0.25	6	149	253	267	40	89	75	18.2
1	30	801.88	1.47	1.30	1.58	5	145	250	265	40	89	75	18.2
B-6	32.5	804.34	1.15	3.17	4.42	10	146	255	263	41	84	76	18.3
5	35	806.80	1.06	2.94	6.86	9.5	144	251	266	41	90	76	18.3
4	37.5	809.81	1.03	2.84	9.26	9	148	248	265	42	90	76	18.1
3	40	811.35	1.02	2.26	1.41	2.5	149	248	260	42	91	76	18.1
2	42.5	813.95	1.75	2.08	3.47	7	146	245	262	42	91	77	18.1
1	45	815.47	1.67	1.86	5.12	6.5	146	247	265	43	92	77	18.1
A-6	47.5	817.88	1.13	3.14	7.95	10	145	247	267	43	91	77	18.1
5	50	820.35	1.05	2.92	0.39	9	143	250	261	45	92	78	18.3
4	52.5	822.83	1.02	2.84	2.80	9	144	252	257	45	92	78	18.3
3	55	824.79	1.72	2.00	4.82	7	147	249	258	46	92	78	18.3
2	57.5	816.80	1.54	1.50	6.57	5	147	247	255	46	92	79	18.3
1	60	828.04	1.37	1.04	8.04	4	140	243	256	46	92	79	18.3
Σ = 50.44							Avg. = 81.9						
1057							1057						

$\theta = 0$ (محور)

722	722

81888

RECEIVED

Av4. = 81.9

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INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress / Silver Bay, Wis Date 5-26-97 Test 15 Run 3
Source 601104 44121201 Stack No. of traverse points 24
Method 5 Filter holder: 6/115 Filter type: 4" G.F.
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.01 cfm at 17 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used: 5619 Recovery solvent(s) Acetone
☒ Acetone
☐ Other(s)

No. of probe wash bottles: 1
Sample recovered by: Mike Koval & D. Hanson

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	639	457	172
Impinger No. 3			
Condenser			
Desiccant	1370	1354	16
Total			198

Integrated Gas Sampling Data: 44 / Trailer

Bag Pump No. _____ Box No. _____ Bag No. _____
Bag Material: 5-layer Aluminized Tedlar Size: 44 L
Pretest leak check: _____ cc/min at _____ in. Hg.
Time start: _____ (HRS) Time end: _____ (HRS)
Sampling rate: _____ cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: 5

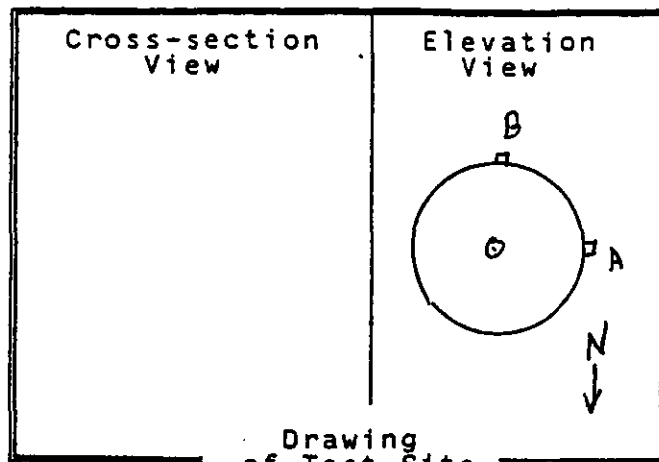
INTERPOL LABORATORIES EPA METHOD 3 FIELD DATA SHEET

Job: Superfund Site Investigation Operator: Jack Kelly Pitot No. 220-212 Cp 1.94
 Source: 104 West 1st St Meter Box No. 11 Bar. Press. 29.86 InHg H2O 20.24 X
 Date: 5-26-84 1984 15 Hrs 3 Gas meter const. 9980 Nozzle No. 6-7 Nozzle Dia. 2.52 IN.

Transfer Point No.	Sampling Time (min)	Sample Volume (cuf)	Velocity Head (inHG)	Orifice Meter (inHG)	Dep. Vol. (cuf)	VAC. inHG	Temperature (°F)						Oxygen (xv/v)
							Stack	Probe	Down	Up	Gas In	Gas Out	
1-6	1140	028.30	1.20	3.27	0.87	9	147	247	263	41	75	75	18.5
5	2.5	030.80	1.18	3.19	3.39	9	144	253	266	41	77	75	18.3
4	2.5	033.35	1.03	2.81	5.77	8	140	250	262	42	79	75	18.3
3	10	037.87	1.03	2.26	2.90	7	141	256	260	42	81	75	18.2
2	12.5	039.65	1.37	1.55	9.68	5.5	143	260	265	42	84	75	18.3
1	15	041.37	1.46	1.26	1.28	5	142	254	261	42	85	75	18.3
13-6	17.5	043.93	1.22	3.33	3.87	10	143	250	260	44	85	75	18.3
5	20	046.40	1.18	3.23	6.43	10	142	247	263	44	87	75	18.3
4	22.5	048.01	1.06	2.89	8.85	9	145	249	267	45	87	75	18.1
3	25	051.10	1.93	2.54	1.12	8	145	249	262	46	87	76	18.1
2	27.5	053.20	1.75	2.04	3.15	7	147	249	257	46	88	76	18.1
1	30	055.09	1.66	1.81	5.08	6	144	253	257	47	88	76	18.2
C-6	32.5	057.50	1.08	1.96	2.53	9	143	255	261	47	87	76	18.0
5	35	059.95	1.00	2.73	2.88	8.5	145	255	263	47	88	76	17.8
4	37.5	062.07	1.42	2.52	2.14	8	145	256	260	48	88	76	17.9
3	40	064.25	1.82	2.23	4.27	7.5	148	257	253	48	89	76	17.9
2	42.5	066.14	1.60	1.64	6.10	7	147	253	257	49	89	76	17.9
1	45	067.76	1.49	1.35	7.76	5	142	253	260	48	89	76	18.1
12-6	47.5	070.15	1.00	2.25	0.13	8	142	250	259	48	88	76	18.1
5	50	072.24	1.04	2.30	2.29	8	145	247	257	48	89	76	18.1
4	52.5	074.27	1.73	2.00	4.31	7	145	251	255	48	90	76	18.1
3	55	076.24	1.68	1.86	6.26	6.5	146	253	253	48	90	77	18.0
2	57.5	078.05	1.54	1.62	8.09	6	144	246	250	49	90	77	18.0
1	60	079.76	1.54	1.49	9.83	5	140	244	247	49	91	76	18.0
12-12													
Σ = 660													
Avg. = 81.0													

INTERPOLL LABORATORIES - EPA METHOD 2 FIELD DATA SHEET

Job Cyprus
 Source NO 1105 Dellertizer Stack
 Test 16 Run Date 5/26/94
 Stack dimen. 71 IN.
 Dry bulb °F Wet bulb °F
 Manometer: ☐ Reg. ☐ Exp. ☐ Elec.
 Barometric pressure 29.46 in Hg
 Static pressure -.24 in WC
 Operators D. Van Hoever & D. Vapler
 Pitot No. 122-6 C, .84



Traverse Point No.	Fraction of Diameter	Distance from Stack Wall (in)	Distance from End of Port (in)	Velocity Pressure (in WC)	Temperature of gas (°F)
		Port length: <u>5</u> in.		Time start: <u> </u> hrs	
A 1	.021	1.49	6.49		
2	.067	4.76	9.76		
3	.118	8.34	13.38		
4	.177	12.56	17.56		
5	.25	17.75	22.75		
6	.356	25.27	30.27		
7	.644	45.72	50.72		
8	.75	53.25	58.25		
9	.823	58.43	63.43		
10	.882	62.62	67.62		
11	.939	66.67	71.67		
12	.979	69.5	74.5		
B 1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Temp. meas. device & S/N:				Time end: <u> </u> hrs	

INTERFOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job Cyprus Date 5/26/94 Test 06 Run 1
 Source No 115 Pelletier (Stack) No. of traverse points 24
 Method 5 Filter holder: glass Filter type: glass fiber

Sample Train Leak Check:

Pretest: { 0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: { 0 cfm at 13 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: _____ Recovery solvent(s) _____

☒ acetone _____
☐ other(s) _____

No. of probe wash bottles: 1
 Sample recovered by: DVA

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	331	200	131
Impinger No. 3			
Condenser			
Desiccant	1453	1430	23
Total			154

Integrated Gas Sampling Data:

Bag Pump No. _____ Box No. _____ Bag No. _____

Bag Material: 5-layer Aluminized Tedlar Size: 44 L

Pretest leak check: _____ cc/min at _____ in. Hg.

Time start: _____ (HRS) Time end: _____ (HRS)

Sampling rate: _____ cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

CF-023

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job CYPRESS Operator Don & D Pilot No. V22-6 Cp. 5x
 Source NO 105 PELLETIZER STACK Motor Box No. 3 Bar. Press. 20.46 IN HG H2O 17
 Date 5/26/94 1991 16 Run 1 Gasometer Count. 9883 Nozzle No. 7-4 Nozzle Dia. 2.8 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inH ₂ O)	Drifted Water (inH ₂ O)	Des. Vol. (cf)	VAC. inHg	Temperatures (°F)						Oxygen (x%)
							Stack	Probe	Oven	Imp.	Gas In	Gas Out	
A 12	0810	767.56	1.05	2.84	9.93	10	120	251	247	50	75	75	18.2
11	2.5	769.94	1.05	2.85	2.32	10	123				79	75	18.2
10	7.5	772.29	1.05	2.85	4.11	10	148				80	76	18.2
9	10	774.70	1.05	2.84	7.11	10	151	254	253	50	82	76	17.9
8	12.5	777.03	1.05	2.68	9.43	10	153				82	76	17.9
7	15	779.47	1.05	2.68	1.76	10	153				83	77	17.7
6	17.5	781.64	1.03	2.63	4.06	10	153	254	253	51	83	78	17.7
5	20	784.01	1.0	2.56	6.34	10	152				83	77	17.8
4	22.5	786.30	1.0	2.56	8.61	10	152				83	77	17.6
3	25	788.63	.99	2.53	0.88	10	152	256	254	51	83	77	17.4
2	27.5	790.95	.84	2.14	2.96	8	155				83	77	17.4
1	30	792.99	.55	1.40	4.65	6	155				83	77	17.4
3 12	32.5	794.86	.75	1.91	6.62	7	155	255	252	50	79	75	17.7
11	35	796.71	.75	1.95	8.60	7	138				79	75	17.7
10	37.5	798.60	.88	2.29	0.75	8	138	252	255	52	79	74	17.7
9	40	800.86	.99	2.57	3.02	10	138				81	74	17.7
8	42.5	803.15	1.03	2.65	5.33	10	146				82	75	17.8
7	45	805.46	.99	2.55	7.60	9	146				83	75	17.8
6	47.5	807.75	.97	2.51	9.85	9	144	255	250	52	84	76	17.8
5	50	809.99	.98	2.54	2.12	9	144				85	76	17.7
4	52.5	812.24	.96	2.49	4.37	8	144				86	77	17.6
3	55	814.42	.95	2.47	6.60	8	144	256	251	50	87	78	17.6
2	57.5	816.59	.76	1.97	8.61	8	144				87	78	17.6
1	60	818.65	.54	1.40	0.30	6	147				88	79	17.6
(0912)		V ₀ = 52.75											
0 =		Avg. = 76.1											

INTERPOLL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job Cyprus
 Source NO 1105 Pelletizer Stack
 Method 5 Filter holder: 91055

Date 3/26/92 Test 16 Run 2
 No. of traverse points 24
 Filter type: glass fiber

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 12 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: Recovery solvent(s)

☒ acetone
☐ other(s)

No. of probe wash bottles: 1

Sample recovered by: DUT

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	343	200	143
Impinger No. 3			
Condenser			
Desiccant	1412	1400	12
Total			155

Integrated Gas Sampling Data:

Bag Pump No. _____ Box No. _____ Bag No. _____

Bag Material: 5-layer Aluminized Tedlar Size: 44 L

Pretest leak check: _____ cc/min at _____ in. Hg.

Time start: _____ (HRS) Time end: _____ (HRS)

Sampling rate: _____ cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

CF-023

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job CYRUS Source NO. 105 BELLETERE STAGE Date 5/20/84 1984 Run 2

Operators DEAN & D.V. Pilot No. U22-6 Dp. 84

Motor Box No. 3 Bar. Press. 22.46 IN HG H2O 13

Computer Cont. 8883 Nozzle No. 7-2 Nozzle Dia. 2.48 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inHG)	Drifts Water (inHG)	Des. Vol. (cf)	VAD. inHG	Temperature (°F)						Dwyer (xv/v)
							Stack	Probe	Dwyer	Impg.	Gas In	Gas Out	
B 12	0955	820.65		2.03	3.67	6	148	252	253	46	71	71	18.3
11	2.5	822.68	.72	2.43	4.87	8	148				80	73	19.1
10	5	824.96	.87	2.77	7.23	8	152				82	74	19.1
9	7.5	827.26	.89	2.78	9.59	8	153	254	256	45	85	75	19.0
8	10	829.61	.99	2.76	1.95	8	153				87	75	19.5
7	12.5	831.86	.98	2.74	4.31	8	153				87	77	19.4
6	15	834.18	.97	2.75	6.67	8	152	256	257	46	88	78	19.4
5	17.5	836.50	.97	2.69	9.01	8	152				89	78	19.4
4	20	839.00	.95	2.67	1.34	8	151				90	79	19.5
3	22.5	841.30	.94	2.45	3.58	8	151				90	79	19.5
2	25	843.61	.86	1.97	5.59	6	151	257	257	46	91	80	19.7
1	27.5	845.62	.69	1.49	7.34	5	150				91	81	19.5
	30	847.71	.52	1.49	9.67	8	150				89	82	19.4
A 12	32.5	849.74	.93	2.66	1.87	7	151	256	258	45	90	82	19.4
11	35	851.99	.83	2.39	4.12	7	147				90	82	19.4
10	37.5	854.23	.86	2.47	6.57	8	148				90	82	19.4
9	40	856.62	1.02	2.93	8.98	7	148	258	257	47	90	82	19.3
8	42.5	858.97	.99	2.84	1.37	8	148				90	82	19.3
7	45	861.44	.98	2.80	3.73	8	150				90	82	19.3
6	47.5	863.82	.95	2.71	6.09	8	152	256	251	46	89	82	19.4
5	50	866.18	.96	2.73	8.53	9	152				89	82	19.4
4	52.5	868.61	1.02	2.91	0.96	9	151				89	82	19.4
3	55	870.04	1.01	2.90	3.35	8	151	254	253	48	89	82	19.4
2	57.5	873.43	.97	2.78	5.68	8	148				89	82	19.4
1	60	875.68	.93	2.67		8	148				89	82	19.4
	1057												
		V _s = 55.03	H = 2.60								Avg. = 83.5		
		θ = 60											

INTERPOL LABORATORIES EPA METHOD 5/17 SAMPLE LOG SHEET

Job Cyprus
 Source IND 1105 Pelletizer STACK
 Method 5 Filter holder: glass

Date 5/25/95 Test 16 Run 2
 No. of traverse points 24
 Filter type: glass fiber

Sample Train Leak Check:

Pretest: (0.02 cfm at 15 in. Hg. (vac) ☒
 Posttest: 0 cfm at 11 in. Hg. (vac) ☒

Particulate Catch Data:

No.s of filters used: Recovery solvent(s)

☒ acetone
☐ other(s)

No. of probe wash bottles: 1
 Sample recovered by: DAH

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	373	200	173
Impinger No. 3			
Condenser			
Desiccant	1479	1465	14
Total			187

Integrated Gas Sampling Data:

Bag Pump No. _____ Box No. _____ Bag No. _____

Bag Material: 5-layer Aluminized Tedlar Size: 44 L

Pretest leak check: _____ cc/min at _____ in. Hg.

Time start: _____ (HRS) Time end: _____ (HRS)

Sampling rate: _____ cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

CF-023

INTERPOLL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Cyprus
 Source 11 No. 11 Pelletizer Stack
 Date 5/26/94 16 Run 3

Operator DAN & D.V.
 Meter Box No. 3
 Gas meter serial 9883

Pilot No. V22-6 Cp. 84
 Bar. Press. 29.46 inHg
 H₂O 13 in.
 Nozzle No. 7-2 Nozzle Dia. 2.48 in.

Transfer Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inWC)	Drifts Meter (inWC)	Dep. Vol. (cf)	VAC. inHg	Temperature (°F)				Gas In	Gas Out	Oxygen (xv/v)
							Stack	Probe	Duct	Impg.			
12	140	878.50	94	2.67	0.83	8	151	254	253	47	74	74	18.8
11	2.5	880.90	90	2.49	3.06	8	158				82	76	18.4
10	5	888.04	90	2.48	5.30	8	159				83	77	17.9
9	7.5	885.51	89	2.68	7.62	8	159	254	256	49	85	78	17.8
8	10	887.66	96	2.78	0.00	8	156				85	78	18.6
7	12.5	890.03	99	2.74	2.35	8	160				88	79	17.8
6	15	892.41	98	2.66	4.68	8	160	254	256	50	88	79	17.8
5	17.5	894.73	95	2.73	7.04	8	157				88	79	18.3
4	20	897.10	97	2.69	9.38	8	161				90	80	17.8
3	22.5	899.50	96	2.69	1.72	8	155	254	256	51	90	80	18.1
2	25	901.70	95	2.18	3.83	8	155				90	80	17.7
1	27.5	903.84	77	1.33	5.49	5	155				90	81	17.7
12	30	905.56	47	2.16	7.59	8	155	256	254	52	88	81	17.8
11	32.5	907.77	76	2.27	9.74	7	155				91	82	17.9
10	35	909.70	80	2.64	2.06	8	155				91	82	17.8
9	37.5	912.06	93	2.81	4.46	10	154	257	255	52	92	83	17.7
8	40	914.41	98	2.87	6.88	10	150				92	83	17.7
7	42.5	916.84	1.0	2.85	9.30	10	153				92	83	17.7
6	45	919.31	1.0	2.77	1.69	10	153	256	254	52	92	84	17.7
5	47.5	921.61	97	2.73	4.05	10	155				93	84	17.8
4	50	924.05	96	2.70	6.41	10	156				93	84	17.8
3	52.5	926.37	95	2.68	8.75	10	156	251	256	53	93	85	17.7
2	55	928.78	94	2.63	1.08	10	155				93	85	17.7
1	57.5	931.11	93	2.63	3.28		150				93	85	17.6
1	60	933.25	84	2.36									
(1241)													
Σ = 60		V ₀ = 54.78		ΔH = 2.57								Avg. = 84.9	

INTERPOL LABORATORIES, INC.
(612) 786-6020
EPA Method 2 Field Data Sheet

Drawing of Test Site

Job Cypress
Source No. 2 Boiler STACK
Test 17 Run 110 Date 5-26-94
Stack Dimen. 110 IN.
Dry Bulb 270 °F Wet bulb 125 °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 29.46 IN.HG
Static Pressure -.83 IN.WC
Operators RON ROSENTHAL KEVIN NEUSMEYER
Pitot No. 23v-12 C. .840

Cross-section View	Elevation View

Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: <u>15</u> IN.	Time Start: <u>1000</u> HRS		
B- 1	.021	2.31	17.31	.50	275
2	.067	7.37	22.37	.60	
3	.118	12.98	27.98	.65	
4	.177	19.47	34.47	.70	
5	.250	27.50	42.50	.70	
6	.356	39.16	54.16	.64	
7	.644	70.84	85.84	.60	
8	.750	82.50	97.50	.62	
9	.823	90.53	105.53	.60	
10	.882	97.02	112.02	.59	
11	.933	102.63	117.63	.64	
12	.979	107.69	122.69	.58	
A- 1				.43	
2				.48	
3				.45	
4				.53	
5				.54	
6				.64	
7				.68	
8				.70	
9				.69	
10				.70	
11				.64	
12				.55	
Temp. Meas. Device & S/N:				Time End: <u>1015</u> HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

032594-G:STACKWPAFORMSS-392.1

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CYPRUS
Source NO. 2 BOILER STACK
Method S Filter holder: 4" glass
Sample Train Leak Check: ✓

Date 5-26-94 Test 17 Run 1
No. of traverse points 24
Filter type: glass fiber

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ✓
Post test: ∞ cfm at 15 in. Hg. (vac) ✓
P27075 C 4.7 to W.C.
Particulate Catch Data:

No. of filters used:

1286

Recovery solvent(s)

☐ acetone

☒ other(s) MECL₂ / TOLUENE

No. of probe wash bottles:

Sample recovered by:

R.R. / K.N.

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	541	477	64
Impinger No. 2			
Impinger No. 3	489	485	4
Condenser			
Desiccant	1444	1431	13
Total			81

Integrated Gas Sampling Data:

Bag Pump No. 224
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 1053
Sampling rate: 400

Box No. 6 Bag No. 1
Size: 44 L
cc/min at 10 in. Hg.
(HRS) Time end: 1205 (HRS)
cc/min Operator: RR

S/N of O₂ Analyzer used to monitor train outlet:

4

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job CYRUS 2002 Boiler 17 Stack
 Date 5-28-74 1974 Non
 Operator R.R. / K.N. Pitot No. 231-0 Cp 840
 Meter Box No. 8 IN UC Bar. Press. 29.83 IN Hg H2O 70 x
 Gasometer Const. 1.0078 Nozzle No. 91-4 Nozzle Dia. .227 IN.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (in H ₂ O)	Orifice Meter (in H ₂ O)	Dep. Vol. (cf)	VAC. in Hg	Temperature (°F)				Gas/Dst	Oxygen (K ₂ O)
							Stack	Probe	Oven	Inlet		
B-12	10.53	683.80	.65	1.14	5.26	7	275	256	236	34	60	53
11	2.5	685.30	.70	1.18	6.73	7	275	254	238	38	61	58
10	5	686.84	.76	1.32	8.30	8	275	254	234	37	61	57
9	7.5	688.35	.74	1.28	7.84	8	276	248	234	37	63	60
8	12.5	689.82	.70	1.21	1.35	9	276	249	236	38	64	60
7	15	692.86	.72	1.25	2.89	9	275	247	242	38	66	61
6	17.5	694.37	.73	1.27	4.43	9	275	247	241	38	68	62
5	20	695.92	.72	1.26	5.98	9	275	241	234	38	68	62
4	22.5	697.46	.74	1.29	7.54	10	275	240	237	39	71	64
3	25	699.04	.70	1.23	9.09	10	275	242	255	39	71	64
2	27.5	700.58	.68	1.20	0.57	10	275	242	254	39	70	64
1	30	702.06	.65	1.14	2.05	9	275	240	242	39	71	64
A-12	32.5	703.46	.57	1.00	3.43	6	275	235	243	38	71	66
11	35	704.95	.63	1.11	4.88	7	275	231	251	38	72	67
10	37.5	706.36	.67	1.18	6.38	7	275	232	258	38	73	67
9	40	708.02	.71	1.25	7.92	7	275	229	265	41	74	68
8	42.5	709.52	.65	1.15	9.41	7	275	231	256	42	74	68
7	45	710.89	.63	1.11	0.87	7	275	232	255	42	74	68
6	47.5	712.32	.62	1.10	2.31	7	275	230	267	43	75	69
5	50	713.75	.60	1.06	3.74	7	274	234	261	44	76	69
4	52.5	715.32	.72	1.28	5.31	7	274	234	258	45	76	70
3	55	716.77	.71	1.26	6.86	7	275	231	252	45	77	70
2	57.5	718.35	.68	1.21	8.39	8	275	234	245	45	77	71
1	60	719.93	.70	1.25	9.93	8	275	237	251	46	78	71
	(120.5)										Av. = 67.2	
	0 = 60	Y. = 36.13										

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CYPRUS Date 5-26-94 Test 17 Run 2
Source No. 2 Boiler STACK No. of traverse points 24
Method 4ms Filter holder: 4" Fibb Filter type: PA/FFX
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: .00 cfm at 8 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

1287
1288

Recovery solvent(s)

☐ acetone
☒ Other(s) MECL₂, .1N HNO₃

No. of probe wash bottles:

Sample recovered by:

2
R.R. & K.N.

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	<u>466</u>	<u>400</u>	<u>66</u>
Impinger No. 3			
Condenser			
Desiccant	<u>1430</u>	<u>1422</u>	<u>8</u>
Total			<u>74</u>

Integrated Gas Sampling Data:

Bag Pump No. 22A
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 1245
Sampling rate: 400

Box No. 6 Bag No. 2
Size: 44 L
cc/min at 10 in. Hg.
(HRS) Time end: 1408 (HRS)
cc/min Operator: RR

S/N of O₂ Analyzer used to monitor train outlet:

4

123093-G:STACKWP:METHODS:IS-0046RR

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress North Shore
Source B&B Storage Truck
Method 1-5 Filter holder: 4" Glass
Sample Train Leak Check:

Date 5-25-94 Test 21 Run 2
No. of traverse points 24
Filter type: 4" Glass fiber

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.02 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

6639

Recovery solvent(s)

☒ Acetone
☐ Other(s)

No. of probe wash bottles:

Sample recovered by:

1
SB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	<u>504</u>	<u>502</u>	<u>2</u>
Impinger No. 3			
Condenser			
Desiccant	<u>1574</u>	<u>1500</u>	<u>14</u>
Total			<u>16</u>

Integrated Gas Sampling Data: N/A

Bag Pump No. _____
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: _____
Time start: _____
Sampling rate: _____

Box No. _____ Bag No. _____
Size: 44 L
cc/min at _____ in. Hg.
(HRS) Time end: _____ (HRS)
cc/min Operator: _____

S/N of O₂ Analyzer used to monitor train outlet: _____

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job CYPRUS Date 5-26-94 Test 17 Run 3
Source No. 2 Boiler Stack No. of traverse points 24
Method 4ms Filter holder: 4" Teflon Filter type: PA/PA
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: .00 cfm at 15 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

Recovery solvent(s)

1289

☐ acetone
☒ Other(s) MECL₂ & 1N HNO₃

No. of probe wash bottles:

2
R.R. / K.W.

Sample recovered by:

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1	580	489	71
Impinger No. 2			
Impinger No. 3	467	479	-12
Condenser			
Desiccant	1430	1422	8
Total			67

Integrated Gas Sampling Data:

Bag Pump No. 22A
Bag Material: 5-layer Aluminized Tedlar
Pretest leak check: 0
Time start: 1438
Sampling rate: 400

Box No. 6 Bag No. 3
Size: 44 L
cc/min at 10 in. Hg.
(HRS) Time end: 1540 (HRS)
cc/min Operator: RR

S/N of O₂ Analyzer used to monitor train outlet:

4

123093-GASTACK\WPMETHODS\0046RR

INTERPOLL LABORATORIES, INC.
(612) 786-6020

Interpoll Laboratories EPA Method 5/17 Sample Log Sheet

Job Cypress North Shore Date 5-25-94 Test 21 Run 3
Source Birch Mountain Area No. of traverse points 24
Method 1-5 Filter holder: 4" Q-Loc Filter type: 4" Q-Loc Fibers
Sample Train Leak Check:

Pretest: ≤ 0.02 cfm at 15 in. Hg. (vac) ☒
Post test: 0.00 cfm at 10 in. Hg. (vac) ☒

Particulate Catch Data:

No. of filters used:

Recovery solvent(s)

6642

☒ acetone
☐ other(s)

No. of probe wash bottles:

1

Sample recovered by:

SB

Condensate Data:

Item	Weight (g)		
	Final	Tare	Difference
Impinger No. 1			
Impinger No. 2	500	497	3
Impinger No. 3			
Condenser			
Desiccant	1504	1496	8
Total			11

Integrated Gas Sampling Data: N/A

Bag Pump No.

Box No.

Bag No.

Bag Material:

5-layer Aluminized Tedlar

Size:

44 L

Pretest leak check:

cc/min at

in. Hg.

Time start:

(HRS) Time end:

(HRS)

Sampling rate:

cc/min Operator:

S/N of O₂ Analyzer used to monitor train outlet:

123093-G:STACK\WPMETHODS\IS-0046RR

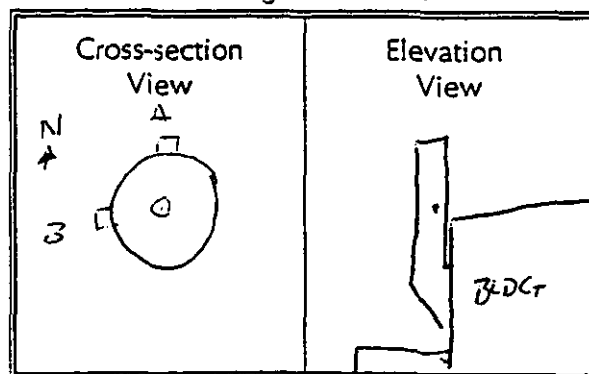
INTERPOLL LABORATORIES, INC.

(612) 786-6020

EPA Method 2 Field Data Sheet

Drawing of Test Site

Job Cypress North Mine
 Source Day Cabin Mine
 Test 19 Run 0 Date 5-26-96
 Stack Dimen. 61.25 IN.
 Dry Bulb 66 °F Wet bulb _____ °F
 Manometer ☒ Reg. ☐ Exp ☐ Elec.
 Barometric Pressure 29.46 IN.HG
 Static Pressure - .86 IN.WC
 Operators SB + RJ
 Pitot No. 224-6 C_p 240



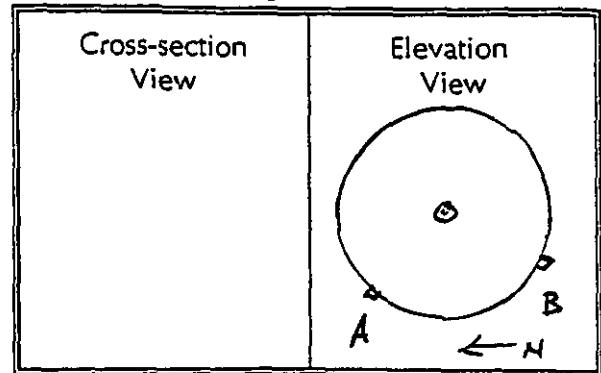
Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: <u>2.25</u> IN.	Time Start: <u>0950</u> HRS		
A-1	.021	1.29	3.54	.50	66
2	.067	4.10	6.35	.75	66
3	.118	7.23	9.48	.88	66
4	.177	10.84	13.09	.93	66
5	.250	15.31	17.56	.93	66
6	.356	21.81	24.06	1.05	66
7	.644	39.45	41.70	1.10	66
8	.750	45.94	48.19	1.05	66
9	.823	50.91	52.66	1.00	66
10	.882	54.02	56.27	1.08	66
11	.933	57.15	59.40	1.10	66
12	.979	59.96	62.21	1.10	66
B-1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Temp. Meas. Device & S/N: <u>Digital 716-PD1 50</u>				<u>0955</u> Time End:	HRS

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOLL LABORATORIES, INC.
(612) 786-6020
EPA Method 2 Field Data Sheet

Job Cyprus
Source No 2 Boiler Stack
Test 23 Run 110 Date 5/27/64
Stack Dimen. _____ IN.
Dry Bulb _____ °F Wet bulb _____ °F
Manometer ☐ Reg. ☐ Exp. ☐ Elec.
Barometric Pressure 29.40 IN.HG
Static Pressure -.97 IN.WC
Operators D. Van Hoever + D. Marso
Pitot No. V27-10 Cp .84

Drawing of Test Site



Traverse Point No.	Fraction of Diameter	Distance From Stack Wall (IN.)	Distance From End of Port (IN.)	Velocity	Temp. of Gas (°F)
		Port Length: <u>15</u> IN.	Time Start: _____ HRS		
A 1	.021	2.31	17.31		
2	.067	7.37	22.37		
3	.118	12.98	27.98		
4	.177	19.47	34.47		
5	.25	27.5	42.5		
6	.356	39.16	54.16		
7	.644	70.84	85.84		
8	.75	82.5	97.5		
9	.823	90.53	105.53		
10	.882	97.02	112.02		
11	.933	102.63	117.63		
12	.979	107.69	122.69		
B 1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
Temp. Meas. Device & S/N:				Time End: _____ HRS	

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Cypress North Shore
 Source Drum Collected Street
 Date 5-26-81 Test 19 Run 1

Operators SB+FS
 Motor Box No. 14 AMP 180 IN HE
 Generator Coeff. 1.0566

Pitot No. 22V-6 Cp .870
 Bar. Press. 29.40 IN H2O
 Nozzle No. 4-3 Nozzle Dia. .85 IN

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inH ₂ O)	Orifice Meter (inH ₂ O)	Dep. Vol. (cf)	VAC. inH ₂	Temperatures (°F)						Oxygen (xv/v)
							Stack	Probe	Duct	Inlet	Gas/Out		
A - 12													
12	2.5	(178.40)	1.10	1.38	0.00	6	66	251	248	40	63	63	20.9
11	5	181.67	1.12	1.42	1.64	6	66				64	63	Outlet
10	7.5	183.30	1.12	1.41	3.27	6	67	251	248	40	64	63	air
9	10	184.95	1.15	1.45	4.92	6	67				64	63	
8	12.5	186.63	1.05	1.33	6.51	6	67	251	247	41	66	63	
7	15	188.20	1.05	1.33	8.09	6	67				68	63	
6	17.5	189.74	1.02	1.29	9.66	6	67	251	250	40	70	63	
5	20	191.19	.95	1.21	1.17	5	67				72	64	
4	22.5	192.65	.90	1.15	2.65	5	64	250	254	40	73	64	
3	25	194.11	.88	1.13	4.12	5	64				74	64	
2	27.5	195.50	.79	1.01	5.51	5	65	250	251	41	74	64	
1	30	196.87	.75	.96	6.87	5	64				77	64	
B - 12													
12	32.5	198.33	.88	1.13	8.34	5	64	250	251	41	78	64	
11	35	194.82	.86	1.11	9.80	5	64				78	64	
10	37.5	201.32	.88	1.13	1.27	5	67	251	254	41	80	65	
9	40	202.70	.88	1.13	2.74	5	67				80	65	
8	42.5	204.37	.95	1.22	4.27	5	65	250	255	40	81	66	
7	45	205.83	.97	1.25	5.83	5	65				82	66	
6	47.5	207.46	1.10	1.43	7.48	5	64	249	256	39	82	66	
5	50	209.00	1.10	1.43	9.14	5	64				83	67	
4	52.5	210.44	1.12	1.45	0.81	5	64	249	258	39	84	67	
3	55	212.14	1.10	1.43	2.47	5	65				84	68	
2	57.5	214.10	1.10	1.42	4.13	5	66	249	258	39	85	68	
1	60	215.69	.97	1.26	5.69	5	65				85	69	
(1101)													
0 = 60							Avg. = 70.2						

h61245	1100
17. 6N	1100
Cyprus	100

23 Nov 1

Operator DiH & DM
Meter Box No. 8
Greatest amt. 1.00

[illegible]

Pilot No. V27-10 Cy 84
Bar. Press. 29.40
No. 11214 No. 11214

Transfer Point No.	Sampling Time (min)	Sample Volume (cfs)	Velocity Head (ft)	Orifice Meter (ft)	Obs. Vel. (cfs)	VAC. inHg	Temperature (°F)					Oxygen (cc/v)	
							Stack	Probe	Oven	Insp.	Gas In		Gas/Out
A 12	0803	796.1	.85	2.17	8.12	8	280	251	246	53	52	52	0.0.5
11	2.5	798.15	.77	1.82	9.95	7	280				57	54	
10	7.5	800.96	.82	1.96	1.85	7	274				59	55	
9	10	801.87	.82	1.97	3.77	7	274	256	255	53	61	56	
8	12.5	803.74	.89	2.14	5.76	7	274				62	57	
7	15	805.70	.92	2.21	7.79	7	275				63	57	
6	17.5	807.66	.88	2.12	9.78	7	275	254	251	53	64	58	
5	20	809.70	.85	2.05	1.74	7	277				66	59	
4	22.5	811.62	.88	2.13	3.74	7	275				66	60	
3	25	813.70	.84	2.03	5.69	7	279	255	253	52	66	60	
2	27.5	815.63	.84	2.03	7.64	7	279				67	60	
1	30	817.64	.90	2.17	9.66	7	278				67	60	
B 12	32.5	819.64	.92	2.22	1.71	8	278	254	251	53	63	60	
11	35	823.78	.92	2.21	3.74	8	280				64	60	
10	37.5	825.92	.93	2.24	5.79	8	279				65	60	
9	40	827.94	.96	2.31	7.86	8	281	256	253	54	66	61	
8	42.5	829.00	.96	2.31	9.95	8	280				67	61	
7	45	832.10	.94	2.26	2.01	8	282				68	62	
6	47.5	834.14	.88	2.36	4.12	8	283	257	253	54	68	63	
5	50	836.16	.88	2.12	6.12	8	284				68	63	
4	52.5	838.12	.89	2.14	8.13	8	284				69	63	
3	55	840.16	.90	2.16	0.15	8	286	254	251	55	70	64	
2	57.5	842.11	.84	2.02	2.10	8	286				70	64	
1	60	844.02	.80	1.93	4.01	8	286				70	64	
0908		47.92		2.23								Avg. = 57.8	
		θ = 60											

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

CF-D11

Job Cypress Lake Shore

Source Day After Stack

Date 6-28-81 1st Run 2

Operators SB JEF

Water Box No. 12

Gasometer Count. 10000

Pilot No. 22V-6 CP 840

Bar. Press. 29.40 inHg H2O 2

Nozzle No. 4-3 Nozzle Dia. 1/8 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Hood (inHG)	Driftless Meter (inHG)	Des. Vol. (cf)	VAC. inHg	Temperatures (°F)				Gas/Dut	Oxygen (xv/v)
							Stack	Probe	Oven	Inpy.		
B-12	(11.5)	215.90	.85	1.08	733	5	64	241	250	40	77	20.9
11	5	218.88	.84	1.07	876	5	65				81	Arbit
10	7.5	220.53	.86	1.10	0.22	5	65	240	245	40	82	Ar
9	10	221.97	.88	1.12	1.69	5	67				82	
8	12.5	223.43	.92	1.17	3.20	5	66	241	246	40	84	
7	15	224.95	.94	1.20	4.72	5	67				85	
6	17.5	226.57	1.05	1.34	6.34	5	67	245	245	42	87	
5	20	227.99	1.05	1.35	7.96	5	65				87	
4	22.5	229.60	1.15	1.48	9.65	5	65	246	247	41	88	
3	25	231.32	1.18	1.51	1.37	6	68				89	
2	27.5	232.24	1.05	1.35	2.99	6	68	246	247	41	89	
1	30	234.30	.75	.96	4.36	5	68				89	
A-12	32.5	236.10	1.20	1.55	6.09	6	64	241	246	40	90	
11	35	237.92	1.18	1.52	7.82	6	64				90	
10	37.5	239.85	1.15	1.48	9.51	6	64	240	246	41	90	
9	40	241.54	1.12	1.45	1.20	5	64				90	
8	42.5	242.89	1.05	1.36	2.82	5	64	244	246	40	91	
7	45	244.57	1.08	1.40	4.48	5	64				91	
6	47.5	246.19	1.10	1.43	6.15	5	63	244	248	41	91	
5	50	247.78	.95	1.23	7.70	6	63				91	
4	52.5	249.24	.88	1.14	9.20	5	63	245	254	41	92	
3	55	250.78	.85	1.11	0.67	5	63				92	
2	57.5	252.19	.80	1.04	2.10	5	63	244	256	44	92	
1	60	253.48	.74	.96	3.48	5	63				92	
	(12.167)											
		V = 37.58		ΔH = 1.27							Avg. = 80.6	

S-0037R

Sub
Sub
Sub
Sub

Supplies
M/22 Boiler Stack
5/27/64 1061

23 RUN 2

Operator Don & D.M.
Meter Box No. 2111
Counter cost. 1.00

2025-11-28

Plot No.
Bac. Pass.
No. 10

V27-10 43.84

$$\begin{array}{r} 111 \\ \times 602 \\ \hline \end{array}$$

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (ft)	Orifice Water (ft)	Dis. Vel. (ft)	VAC. inHg	Temperature (°F)					Oxygen (xv/v)	
							Stack	Probe	Duct	Imp.	Gas In		Gas Out
B 12	0938	844.4	.93	2.16	6.40	8	289	251	246	47	62	62	0.05
11	2.5	846.40	.9	2.10	8.38	8	290				66	64	
10	5	848.37	.94	2.21	0.43	8	287				68	64	
9	7.5	850.50	.95	2.23	2.48	8	291	254	251	47	68	64	
8	10	852.51	.99	2.34	4.58	8	284				69	65	
7	12.5	854.53	.99	2.35	6.70	8	284				69	65	
6	15	856.65	1.0	2.37	8.80	8	284	256	253	48	70	65	
5	17.5	858.86	.92	2.19	0.84	8	283				71	66	
4	20	860.75	.94	2.23	2.89	8	284				72	66	
3	22.5	862.84	.92	2.18	4.93	8	287	251	254	50	73	67	
2	25	864.89	.92	2.18	6.97	8	287				73	67	
1	27.5	866.98	.84	2.0	8.92	7.5	287				74	67	
	30	868.99	.66	1.57	0.65	5	287	254	256	51	71	67	
A 12	32.5	870.70	.62	1.47	2.32	5	286				73	68	
11	35	872.32	.65	1.55	4.04	5	285				74	68	
10	37.5	874.06	.68	1.63	5.80	5	284	255	254	52	75	69	
9	40	875.80	.70	1.67	7.59	5	285				76	69	
8	42.5	877.56	.80	1.67	9.38	5	286				76	69	
7	45	879.29	.80	1.92	1.30	6	287	256	254	52	77	70	
6	47.5	881.30	.95	2.28	3.39	8	285				77	70	
5	50	883.35	.96	2.30	5.48	8	285				77	70	
4	52.5	885.43	.93	2.22	7.54	8	289	257	253	52	77	70	
3	55	887.46	.93	2.22	9.60	8	289				77	70	
2	57.5	889.53	.86	2.05	1.59	8	289				77	70	
1	60	891.59									77	70	
	(1044)	45.79		2.04							Avg.	69.8	
	0 = 60												

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job Cypress

Team Leader CI

Date Submitted 5-31-94

Test No. 6

Date of Analysis 5-31-94

Source # 2 Hood Vent

Test Site Stack

Date of Test 5-24-94

No. of Runs Completed 3

Technician C. Helgeson

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml)			Conc. CO ₂ %v/v Dry	Conc. O ₂ %v/v Dry	F _o
			Zero Pt.	After CO ₂	After O ₂			
6/1	2471-79 B F	1	0.00	0.30	20.60	0.30	20.30	
		2	0.00	0.30	20.60	0.30	20.30	
		Avg				0.30	20.30	
6/2	-80 B F	1	0.00	0.30	20.60	0.30	20.30	
		2	0.00	0.30	20.60	0.30	20.30	
		Avg				0.30	20.30	
6/3	-81 B F	1	0.00	0.30	20.60	0.30	20.30	
		2	0.00	0.30	20.60	0.30	20.30	
		Avg				0.30	20.30	
	B F	1						
		2						
		Avg						
	B F	1						
		2						
		Avg						
	B F	1						
		2						
		Avg						
	B F	1						
		2						
		Avg						
	B F	1						
		2						
		Avg						
	B F	1						
		2						
		Avg						
	B F	1						
		2						
		Avg						

- ☐ Ambient Air QA Check
☒ Orsat Analyzer System Leak Check
☐ F_o Within EPA M-3 Guidelines
for fuel type.

Where $F_o = \frac{20.9 - O_2}{CO_2}$

F=Flask (250 cc all glass)
B=Tedlar Bag (5-layer)

EPA Method 3 Guidelines	
Fuel Type	F _o Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job Cyprus Source #12 Hood Vent
 Team Leader CT Test Site Stack
 Date Submitted 5-21-94 Date of Test 5-21-94
 Test No. 2 No. of Runs Completed 3
 Date of Analysis 5-21-94 Technician C. Helgeson

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml)			Conc. CO ₂	Conc. O ₂	F _o
			Zero Pt.	After CO ₂	After O ₂	%v/v Dry	%v/v Dry	
2/1	2471-76 □ B □ F	1	0.00	0.30	20.50	0.30	20.20	
		2	0.00	0.30	20.50	0.30	20.20	
		Avg				0.30	20.20	
2/2	-77 □ B □ F	1	0.00	0.30	20.50	0.30	20.02	
		2	0.00	0.30	20.50	0.30	20.20	
		Avg				0.30	20.20	
2/3	-78 □ B □ F	1	0.00	0.30	20.50	0.30	20.3	
		2	0.00	0.30	20.50	0.30	20.20	
		Avg				0.30	20.20	
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						
	□ B □ F	1						
		2						
		Avg						

- ☒ Ambient Air QA Check
☐ Orsat Analyzer System Leak Check
☐ F_o Within EPA M-3 Guidelines
 for fuel type.

Where $F_o = \frac{20.9 - O_2}{CO_2}$

F=Flask (250 cc all glass)
 B=Tedlar Bag (5-layer)

D-1

EPA Method 3 Guidelines

Fuel Type	F _o Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

APPENDIX D

INTERPOLL LABORATORIES ANALYTICAL DATA

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Edward J. Kowalsky

met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator. Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, North Carolina. This certificate is valid for six months from date of issue.

Thomas J. Fore
President

Will S. Lee
Vice President

David B. Savage, Jr.
Program Manager

243006
Certificate Number

Minneapolis
Location

April 7, 1994
Date of Issue

Visible Emissions Form

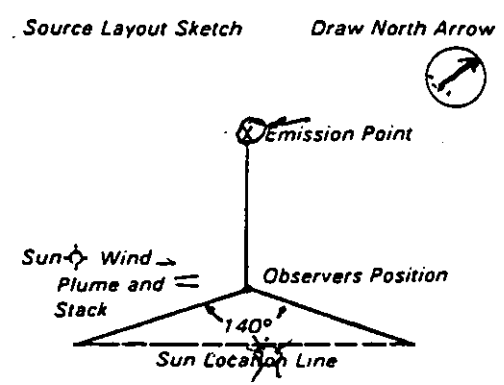
Test 23

SOURCE NAME			OBSERVATION DATE				START TIME		STOP TIME			
Cypres N.S. Mining			05-27-94				08:05		09:05			
ADDRESS			SEC	0	15	30	45	SEC	0	15	30	45
Hwy 61 N			MIN					MIN				
			1	0	0	0	0	31	5	0	0	0
			2	0	0	0	0	32	0	0	0	0
			3	5	0	0	0	33	0	0	0	5
			4	5	5	5	0	34	0	0	0	0
			5	0	0	0	0	35	0	5	0	0
			6	0	5	5	0	36	0	0	0	0
			7	0	0	5	0	37	5	0	0	5
			8	0	0	0	5	38	5	0	5	0
			9	0	0	5	0	39	0	5	5	0
			10	0	0	0	0	40	0	0	5	0
			11	5	0	5	0	41	0	0	0	0
			12	5	0	0	0	42	0	0	0	0
			13	0	0	0	0	43	5	5	5	0
			14	0	0	0	0	44	5	0	0	0
			15	0	0	5	5	45	0	0	0	0
			16	5	0	0	0	46	0	0	0	0
			17	0	5	0	5	47	0	5	5	5
			18	0	0	0	0	48	5	0	0	5
			19	0	0	0	5	49	0	0	0	0
			20	5	0	0	0	50	0	0	0	0
			21	0	0	0	0	51	0	0	0	5
			22	0	0	0	0	52	0	0	0	5
			23	0	0	0	0	53	0	0	0	0
			24	0	0	0	0	54	5	0	0	0
			25	0	0	5	0	55	0	0	0	0
			26	5	0	0	0	56	0	5	0	0
			27	0	0	0	0	57	0	0	0	0
			28	0	0	0	0	58	0	0	0	0
			29	0	5	0	0	59	0	0	0	0
			30	0	0	5	5	60	0	0	0	0
PROCESS EQUIPMENT			OPERATING MODE									
BOILER			100%									
CONTROL EQUIPMENT			OPERATING MODE									
BAG HOUSE			100%									
DESCRIBE EMISSION POINT												
START NORTHERN MOST STACK WITH BLUE RIM STOP SAME												
HEIGHT ABOVE GROUND LEVEL			HEIGHT RELATIVE TO OBSERVER									
START 200' STOP SAME			START 200' STOP SAME									
DISTANCE FROM OBSERVER			DIRECTION FROM OBSERVER									
START 800' STOP SAME			START NW STOP SAME									
DESCRIBE EMISSIONS												
START LOTTING STOP SAME												
EMISSION COLOR			PLUME TYPE: CONTINUOUS ☐									
START GRAY STOP SAME			FUGITIVE ☐ INTERMITTENT ☒									
WATER DROPLETS PRESENT:			IF WATER DROPLET PLUME:									
NO ☒ YES ☐			ATTACHED ☐ DETACHED ☐									
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED												
START 2' above stack STOP SAME												
DESCRIBE BACKGROUND												
START SKY STOP SAME												
BACKGROUND COLOR			SKY CONDITIONS									
START BLUE STOP SAME			START CLEAR STOP SAME									
WIND SPEED			WIND DIRECTION									
START 5-10 STOP SAME			START WSW STOP SAME									
AMBIENT TEMP.			WET BULB TEMP. RH. percent									
START 50°C STOP 54°C			30%									
			AVERAGE OPACITY FOR HIGHEST PERIOD RANGE OF OPACITY READINGS MINIMUM MAXIMUM OBSERVER'S NAME (PRINT) David Vaaler OBSERVER'S SIGNATURE DAVID VAALER DATE 5-27-94 ORGANIZATION INTERPOLL LABS CERTIFIED BY ETA DATE 4-6-94 VERIFIED BY DATE									
COMMENTS												
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TITLE			DATE									

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Test 21

SOURCE NAME <i>C. J. P. R. S. NORTH SHORE MINING</i>			OBSERVATION DATE <i>5-26-94</i>				START TIME <i>1000</i>				STOP TIME <i>1100</i>			
ADDRESS			SEC MIN 0 15 30 45				SEC MIN 0 15 30 45							
			1				31							
CITY <i>SILVIL BAY</i>			2				32							
STATE <i>MIN</i>			3				33							
ZIP			4				34							
PHONE			5				35							
SOURCE ID NUMBER			6				36							
PROCESS EQUIPMENT <i>BIN STORAGE</i>			7				37							
OPERATING MODE			8				38							
CONTROL EQUIPMENT <i>RAA HOUSE</i>			9				39							
OPERATING MODE <i>12481</i>			10				40							
DESCRIBE EMISSION POINT <i>START Round metal stack STOP</i>			11				41							
HEIGHT ABOVE GROUND LEVEL <i>START 25 STOP</i>			12				42							
HEIGHT RELATIVE TO OBSERVER <i>START 25 STOP</i>			13				43							
DISTANCE FROM OBSERVER <i>START 75 STOP</i>			14				44							
DIRECTION FROM OBSERVER <i>START W STOP</i>			15				45							
DESCRIBE EMISSIONS <i>START NONE STOP</i>			16				46							
EMISSION COLOR <i>START NONE STOP</i>			17				47							
PLUME TYPE: CONTINUOUS ☐			18				48							
FUGITIVE ☐ INTERMITTENT ☐			19				49							
WATER DROPLETS PRESENT: <i>NO</i> YES ☐			20				50							
IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐			21				51							
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED <i>START 4' above stack STOP</i>			22				52							
DESCRIBE BACKGROUND <i>START SKY STOP</i>			23				53							
BACKGROUND COLOR <i>START Blue STOP</i>			24				54							
SKY CONDITIONS <i>START 90% clear STOP</i>			25				55							
WIND SPEED <i>START 15 STOP</i>			26				56							
WIND DIRECTION <i>START NE STOP</i>			27				57							
AMBIENT TEMP. <i>START 50 STOP 52</i>			28				58							
WET BULB TEMP. <i>42</i>			29				59							
RH. percent <i>51</i>			30				60							
Source Layout Sketch 			AVERAGE OPACITY FOR HIGHEST PERIOD				NUMBER OF READINGS ABOVE % WERE							
			RANGE OF OPACITY READINGS MINIMUM				MAXIMUM							
COMMENTS			OBSERVER'S NAME (PRINT) <i>Edna R. Thompson</i>				OBSERVER'S SIGNATURE <i>Edna R. Thompson</i>				DATE <i>5-26-94</i>			
			ORGANIZATION <i>Interpoll Labs</i>				CERTIFIED BY <i>ETA</i>				DATE <i>5-7-94</i>			
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Visible Emissions Form

Test 20

SOURCE NAME <i>CYPRESS NORTH SHORE</i>		OBSERVATION DATE <i>5-26-94</i>		START TIME <i>1315</i>		STOP TIME <i>1415</i>	
ADDRESS		SEC MIN	0	15	30	45	SEC MIN
		1	0	0	0	0	31
		2	0	0	0	0	32
CITY <i>SILVER SPRING</i>		3	0	0	0	0	33
STATE <i>MD</i>		4	0	0	0	0	34
ZIP		5	0	0	0	0	35
PHONE		6	0	0	0	0	36
SOURCE ID NUMBER <i>No 2</i>		7	0	0	0	0	37
PROCESS EQUIPMENT <i>FINE CRACKER STACK</i>		8	0	0	0	0	38
OPERATING MODE		9	0	0	0	0	39
CONTROL EQUIPMENT <i>BAF HOUSE</i>		10	0	0	0	0	40
OPERATING MODE		11	0	0	0	0	41
DESCRIBE EMISSION POINT <i>START Round Metal Stack STOP</i>		12	0	0	0	0	42
HEIGHT ABOVE GROUND LEVEL <i>START 150' STOP</i>		13	0	0	0	0	43
HEIGHT RELATIVE TO OBSERVER <i>START 50' STOP</i>		14	0	0	0	0	44
DISTANCE FROM OBSERVER <i>START 150' STOP</i>		15	0	0	0	0	45
DIRECTION FROM OBSERVER <i>START NW STOP</i>		16	0	0	0	0	46
DESCRIBE EMISSIONS <i>START NAAP STOP</i>		17	0	0	0	0	47
EMISSION COLOR <i>START NAAP STOP</i>		18	0	0	0	0	48
PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐		19	0	0	0	0	49
WATER DROPLETS PRESENT: NO ☒ YES ☐		20	0	0	0	0	50
IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐		21	0	0	0	0	51
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED <i>START 4' above stack STOP</i>		22	0	0	0	0	52
DESCRIBE BACKGROUND <i>START SKY STOP</i>		23	0	0	0	0	53
BACKGROUND COLOR <i>START Blue STOP</i>		24	0	0	0	0	54
SKY CONDITIONS <i>START Clear STOP</i>		25	0	0	0	0	55
WIND SPEED <i>START 15 STOP</i>		26	0	0	0	0	56
WIND DIRECTION <i>START NE STOP</i>		27	0	0	0	0	57
AMBIENT TEMP. <i>START 58 STOP 58</i>		28	0	0	0	0	58
WET BULB TEMP <i>39</i>		29	0	0	0	0	59
RH percent <i>39</i>		30	0	0	0	0	60
Source Layout Sketch Draw North Arrow		AVERAGE OPACITY FOR HIGHEST PERIOD RANGE OF OPACITY READINGS MINIMUM MAXIMUM		NUMBER OF READINGS ABOVE % WERE			
COMMENTS		OBSERVER'S NAME (PRINT) <i>THOMAS BRIDGE</i>		DATE <i>5-26-94</i>			
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SIGNATURE		VERIFIED BY		DATE			
TITLE		DATE		DATE			

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Visible Emissions Form

Test 19

SOURCE NAME <i>CYPRESS NORTH SHORE MINING</i>			OBSERVATION DATE <i>5-26-94</i>			START TIME <i>11:05</i>			STOP TIME <i>12:05</i>			
ADDRESS			SEC MIN	0	15	30	45	SEC MIN	0	15	30	45
			1	0	0	0	0	31	0	0	0	0
CITY <i>SILVER BAY</i> STATE <i>VA</i> ZIP			2	0	0	0	0	32	0	0	0	0
PHONE			3	0	0	0	0	33	0	0	0	0
SOURCE ID NUMBER			4	0	0	0	0	34	0	0	0	0
PROCESS EQUIPMENT <i>DRY COBBLER</i>			5	0	0	0	0	35	0	0	0	0
OPERATING MODE			6	0	0	0	0	36	0	0	0	0
CONTROL EQUIPMENT <i>BAG HOUSE</i>			7	0	0	0	0	37	0	0	0	0
OPERATING MODE			8	0	0	0	0	38	0	0	0	0
DESCRIBE EMISSION POINT <i>START ~~Handwritten~~ STOP ✓</i>			9	0	0	0	0	39	0	0	0	0
HEIGHT ABOVE GROUND LEVEL <i>START 120' STOP ✓</i>			10	0	0	0	0	40	0	0	0	0
HEIGHT RELATIVE TO OBSERVER <i>START 60' STOP ✓</i>			11	0	0	0	0	41	0	0	0	0
DISTANCE FROM OBSERVER <i>START 180' STOP ✓</i>			12	0	0	0	0	42	0	0	0	0
DIRECTION FROM OBSERVER <i>START STOP</i>			13	0	0	0	0	43	0	0	0	0
DESCRIBE EMISSIONS <i>START NOND STOP ✓</i>			14	0	0	0	0	44	0	0	0	0
EMISSION COLOR <i>START WHITE STOP ✓</i>			15	0	0	0	0	45	0	0	0	0
PLUME TYPE: CONTINUOUS ☐			16	0	0	0	0	46	0	0	0	0
FUGITIVE ☐ INTERMITTENT ☐			17	0	0	0	0	47	0	0	0	0
WATER DROPLETS PRESENT: <i>NOND YES ☐</i>			18	0	0	0	0	48	0	0	0	0
IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐			19	0	0	0	0	49	0	0	0	0
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED <i>START 4' above Stack STOP ✓</i>			20	0	0	0	0	50	0	0	0	0
DESCRIBE BACKGROUND <i>START SKY STOP ✓</i>			21	0	0	0	0	51	0	0	0	0
BACKGROUND COLOR <i>START BLUE STOP ✓</i>			22	0	0	0	0	52	0	0	0	0
SKY CONDITIONS <i>START CLEAR STOP ✓</i>			23	0	0	0	0	53	0	0	0	0
WIND SPEED <i>START 18 STOP ✓</i>			24	0	0	0	0	54	0	0	0	0
WIND DIRECTION <i>START NE STOP ✓</i>			25	0	0	0	0	55	0	0	0	0
AMBIENT TEMP. <i>START 54 STOP 55</i>			26	0	0	0	0	56	0	0	0	0
WET BULB TEMP. <i>40</i>			27	0	0	0	0	57	0	0	0	0
RH. percent <i>28</i>			28	0	0	0	0	58	0	0	0	0
Source Layout Sketch Draw North Arrow The sketch shows a top-down view of the observation setup. At the top is the 'Emission Point' marked with an 'X'. Below it is the '1ST ROOF'. Further down is the '2ND ROOF'. Below the 2nd roof is the 'Observers Position'. A line labeled 'Sun' with an arrow points towards the left, indicating wind direction. A line labeled 'Plume and Stack' points towards the right. A line labeled 'Sun Location Line' is drawn at a 140-degree angle from the observers position. A north arrow is drawn in the upper right corner.			29	0	0	0	0	59	0	0	0	0
			30	0	0	0	0	60	0	0	0	0
			AVERAGE OPACITY FOR HIGHEST PERIOD			NUMBER OF READINGS ABOVE % WERE						
			RANGE OF OPACITY READINGS			MINIMUM MAXIMUM						
			OBSERVER'S NAME (PRINT) <i>EDWARD THORBRIDGE</i>									
			OBSERVER'S SIGNATURE <i>Edward Thorbridge</i>			DATE <i>5-26-94</i>						
			ORGANIZATION <i>INTERPOLL LABS</i>									
			I HAVE RECEIVED A COPY OF THESE OPACITY OBSERVATIONS									
			SIGNATURE			CERTIFIED BY <i>ETA</i> DATE <i>4-7-94</i>						
			TITLE			VERIFIED BY DATE						

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Test 5

SOURCE NAME <i>CYRUS NORTH SHALE MINING</i>			OBSERVATION DATE <i>5-26-94</i>				START TIME <i>0815</i>		STOP TIME <i>0915</i>			
ADDRESS			SEC MIN	0	15	30	45	SEC MIN	0	15	30	45
			1	0	0	0	0	31	0	0	0	0
			2	0	0	0	0	32	0	0	0	0
CITY <i>SILVER BAY</i>	STATE <i>MIN</i>	ZIP	3	0	0	0	0	33	0	0	0	0
PHONE	SOURCE ID NUMBER <i>NO 12</i>		4	0	0	0	0	34	0	0	0	0
PROCESS EQUIPMENT <i>PELLUTIZER</i>		OPERATING MODE	5	0	0	0	0	35	0	0	0	0
CONTROL EQUIPMENT <i>ROTOR LINE</i>		OPERATING MODE <i>140°</i>	6	0	0	0	0	36	0	0	0	0
DESCRIBE EMISSION POINT <i>START Round METAL STACK STOP</i>			7	0	0	0	0	37	0	0	0	0
HEIGHT ABOVE GROUND LEVEL <i>START 10' STOP</i>		HEIGHT RELATIVE TO OBSERVER <i>START 10' STOP</i>	8	0	0	0	0	38	0	0	0	0
DISTANCE FROM OBSERVER <i>START 30' STOP</i>		DIRECTION FROM OBSERVER <i>START W STOP</i>	9	0	0	0	0	39	0	0	0	0
DESCRIBE EMISSIONS <i>START 10' STOP</i>			10	0	0	0	0	40	0	0	0	0
EMISSION COLOR <i>START 10' STOP</i>		PLUME TYPE: CONTINUOUS ☐ FUGITIVE ☐ INTERMITTENT ☐	11	0	0	0	0	41	0	0	0	0
WATER DROPLETS PRESENT: NO ☒ YES ☐		IF WATER DROPLET PLUME: ATTACHED ☐ DETACHED ☐	12	0	0	0	0	42	0	0	0	0
POINT IN THE PLUME AT WHICH OPACITY WAS DETERMINED <i>START 4' above stack STOP</i>			13	0	0	0	0	43	0	0	0	0
DESCRIBE BACKGROUND <i>START BLDG STOP</i>			14	0	0	0	0	44	0	0	0	0
BACKGROUND COLOR <i>START GRAY STOP</i>		SKY CONDITIONS <i>START CLEAR STOP</i>	15	0	0	0	0	45	0	0	0	0
WIND SPEED <i>START 15 STOP</i>		WIND DIRECTION <i>START N STOP</i>	16	0	0	0	0	46	0	0	0	0
AMBIENT TEMP. <i>START 42 STOP 44</i>		WET BULB TEMP. <i>40</i>	17	0	0	0	0	47	0	0	0	0
		RH. percent <i>70</i>	18	0	0	0	0	48	0	0	0	0
Source Layout Sketch <i>Pelletizer</i> Draw North Arrow Sun $\rightarrow$ Wind $\rightarrow$ Plume and Stack Observers Position Sun Location Line			19	0	0	0	0	49	0	0	0	0
			20	0	0	0	0	50	0	0	0	0
			21	0	0	0	0	51	0	0	0	0
			22	0	0	0	0	52	0	0	0	0
			23	0	0	0	0	53	0	0	0	0
			24	0	0	0	0	54	0	0	0	0
			25	0	0	0	0	55	0	0	0	0
			26	0	0	0	0	56	0	0	0	0
			27	0	0	0	0	57	0	0	0	0
			28	0	0	0	0	58	0	0	0	0
			29	0	0	0	0	59	0	0	0	0
						30	0	0	0	0	60	0
AVERAGE OPACITY FOR HIGHEST PERIOD							NUMBER OF READINGS ABOVE % WERE					
RANGE OF OPACITY READINGS MINIMUM							MAXIMUM					
OBSERVER'S NAME (PRINT) <i>EDWARD TRUBRIDGE</i>												
OBSERVER'S SIGNATURE <i>Edward Trubridge</i>							DATE <i>5-26-94</i>					
ORGANIZATION <i>INTERPOLL LABS</i>												
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TITLE							DATE <i>4.7.94</i>					
DATE							VERIFIED BY					
							DATE					

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

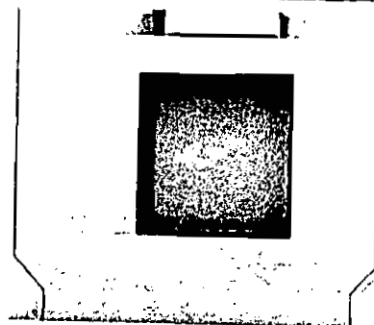
Job Cypress NO 2 BELLEFLO STACK 1001 23 Run 3
 Date 5/27/94
 Operators DUN T JON Pilot No. V27-10 Ch 84
 Meter Box No. 8 Air Press. 29.00 InHg H20 2
 Gasometer Count. 10078 Nozzle No. 10-2 Nozzle Dia. .247 In.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inHG)	Drifts Meter (inHG)	Det. Vol. (cf)	VAC. inHg	Temperature (°F)						Oxygen (xv/v)
							Stack	Probe	Dry	Insp.	Gas In	Gas/Out	
A 12	115	892.04	.66	1.58	3.77	5	281	246	251	50	69	69	0.0.5
11	2.5	893.73	.65	1.49	5.49	5	285				70	71	
10	5	895.46	.71	1.69	7.28	6	285				73	70	
9	7.5	897.25	.73	1.74	9.11	6	286	251	256	50	74	71	
8	10	899.01	.78	1.86	1.00	6	286				76	72	
7	12.5	900.95	.83	1.99	2.95	6	287				76	72	
6	15	902.94	.95	2.27	5.03	8	287	253	254	51	77	72	
5	17.5	905.00	1.0	2.39	7.18	8	287				77	73	
4	20	907.10	.95	2.27	9.27	8	288				77	73	
3	22.5	909.34	.94	2.25	1.35	8	287	254	254	51	77	73	
2	25	911.42	.88	2.11	3.36	8	287				78	73	
1	27.5	913.43	.83	1.99	5.32	7	287				78	73	
B 12	30	915.40	1.0	2.40	7.46	8	287	256	253	50	77	74	
11	32.5	917.53	1.05	2.52	9.66	8	285				79	74	
10	35	919.70	1.05	2.53	1.87	8	286				80	75	
9	37.5	921.86	.90	2.18	3.92	8	284	257	256	51	80	75	
8	40	923.93	.84	2.03	5.90	8	284				80	75	
7	42.5	925.93	.97	2.35	8.02	8	283				80	75	
6	45	928.02	.99	2.39	0.17	8	284	256	255	51	81	75	
5	47.5	930.18	.92	2.23	2.25	8	283				81	76	
4	50	932.25	.95	2.30	4.36	8	284				81	76	
3	52.5	934.39	.90	2.18	6.41	8	284	254	255	52	80	76	
2	55	936.40	.84	2.03	8.39	8	284				80	76	
1	57.5	938.36	.80	1.94	0.32		284				80	76	
	60	940.32					284				80	76	
C 1218													
V = 48.28													
H = 2.12													
V = 60													
Avg. = 75.5													

INTERPOL LABORATORIES EPA METHOD 5 FIELD DATA SHEET

Job Cypress North Shore Operator DB-EJS Pitot No. 200-6 Cp 140
 Source Deception Creek Meter Box No. 14 XHF 285 TN QC Bur. Press. 29.26 inHg H2O 2 X
 Date 5-26-84 Computer conf. 10060 Nozzle No. 0-3 Nozzle Dia 1/8 in.

Traverse Point No.	Sampling Time (min)	Sample Volume (cf)	Velocity Head (inHg)	Drifts Meter (inHg)	Des. Vol. (cf)	VAC. inHg	Temperature (°F)					Oxygen (xv/v)
							Stack	Probe	Duct	Inlet	Gas/Out	
A-12	(1225)	253.60	1.15	1.49	5.30	5	63	248	260	84	77	20.9
11	2.5	255.30	1.10	1.42	6.94	5	63			84	77	20.9
10	5	256.94	1.10	1.42	8.62	5	63	244	260	86	77	20.9
9	7.5	258.15	1.10	1.42	0.23	5	63			87	77	20.9
8	10	260.00	1.02	1.32	1.83	5	63	240	261	89	77	20.9
7	12.5	261.80	1.02	1.32	3.49	5	63			90	77	20.9
6	15	263.25	1.08	1.40	5.16	6	63	247	261	91	77	20.9
5	17.5	265.05	1.10	1.43	6.80	6	63			91	77	20.9
4	20	266.69	1.05	1.37	8.35	6	63	247	260	92	77	20.9
3	22.5	268.42	.94	1.22	9.85	5	64			92	77	20.9
2	25	269.94	.88	1.14	1.39	5	64	247	260	93	78	20.9
1	27.5	271.41	.93	1.21	2.85	5	64			93	78	20.9
B-12	30	272.80	.84	1.09	4.72	5	64	246	261	94	78	20.9
11	32.5	274.31	.84	1.09	5.79	5	64			94	79	20.9
10	35	275.94	.84	1.07	7.27	5	64	246	261	94	79	20.9
9	37.5	277.32	.85	1.11	8.77	5	64			94	79	20.9
8	40	278.79	.88	1.14	0.32	5	64	246	261	95	79	20.9
7	42.5	280.53	.94	1.23	2.00	5	64			95	79	20.9
6	45	282.05	1.10	1.43	3.70	5	65	246	266	95	79	20.9
5	47.5	283.78	1.12	1.46	5.37	5	65			95	80	20.9
4	50	285.36	1.12	1.46	7.11	5	65	247	265	96	80	20.9
3	52.5	287.10	1.15	1.50	8.86	6	63			96	81	20.9
2	55	288.84	1.18	1.55	0.51	6	63	247	261	96	81	20.9
1	57.5	290.50	1.05	1.38	1.90	5	63			96	81	20.9
	60	291.90	.75	.98								
	(1326)											
		V _m = 38.30	H = 130								Avg. = 95.1	
		θ = 6.0										



Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Cyprus Source No 12 Hood Vent
Team Leader ET Test Site Stack
Date Submitted 5-31-94 Date of Test 5-24-94
Test No. 6 No. of Runs Completed 3
Date of Analysis 6-17-94 Technician C. Gierke
Transport Leakage ☒ None ☐ _____ ml Solvent Acetone

Test <u>Run 0</u> Field Blank Log Number _____ Vol. of Solvent _____ ml *Solvent Residue <u>3.64</u> ug/ml	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
Test <u>6</u> Run <u>1</u> Vol. of Solvent <u>170</u> ml Log Number <u>2971-13P</u> Comments _____	Dish No. <u>51</u> Dish Tare Wt. <u>48.8524</u> g Dish+Sample Wt. <u>48.8669</u> g Sample Wt. <u>0.0145</u> g
Test <u>6</u> Run <u>2</u> Vol. of Solvent <u>230</u> ml Log Number <u>-14P</u> Comments _____	Dish No. <u>56</u> Dish Tare Wt. <u>47.7560</u> g Dish+Sample Wt. <u>47.7687</u> g Sample Wt. <u>0.0127</u> g
Test <u>6</u> Run <u>3</u> Vol. of Solvent <u>210</u> ml Log Number <u>-15P</u> Comments _____	Dish No. <u>341</u> Dish Tare Wt. <u>47.6601</u> g Dish+Sample Wt. <u>47.6770</u> g Sample Wt. <u>0.0169</u> g
Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

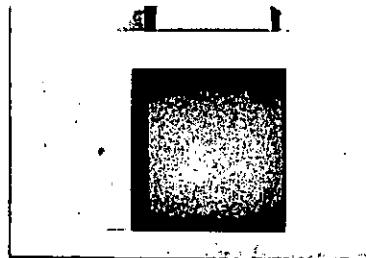
*Solvent Residue _____ ug/ml = [(Sample Wt. _____ g) (10⁶)] / Vol. of Sol. _____ ml
EPA-M5 Acetone Residue Blank Spec. {7.3 ug/ml

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0139	0.0119	0.0161	D-16	

LSC-01YR



Interpoll Laboratories
(312) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Cyprus N.S. Source # 1204 Waste Gas
Team Leader E.T. Test Site Stack
Date Submitted 5-31-94 Date of Test 5-25-94
Test No. 10 No. of Runs Completed 3
Date of Analysis 6-22-94 Technician C. Helgeson
Transport Leakage ☒ None ☐ _____ ml Solvent Acetone

0	Test _____ Run <u>0</u> Field Blank Log Number _____ Vol. of Solvent _____ ml *Solvent Residue <u>3.64</u> ug/ml	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>10</u> Run <u>1</u> Vol. of Solvent <u>150</u> ml Log Number <u>2971-22 P</u> Comments _____	Dish No. <u>175</u> Dish Tare Wt. <u>53.0294</u> g Dish+Sample Wt. <u>53.1353</u> g Sample Wt. <u>0.1059</u> g
2	Test <u>10</u> Run <u>2</u> Vol. of Solvent <u>140</u> ml Log Number <u>-23 P</u> Comments _____	Dish No. <u>328</u> Dish Tare Wt. <u>41.9669</u> g Dish+Sample Wt. <u>42.0436</u> g Sample Wt. <u>0.0767</u> g
3	Test <u>10</u> Run <u>3</u> Vol. of Solvent <u>125</u> ml Log Number <u>-24 P</u> Comments _____	Dish No. <u>506</u> Dish Tare Wt. <u>48.6380</u> g Dish+Sample Wt. <u>48.7035</u> g Sample Wt. <u>0.0655</u> g
4	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

*Solvent Residue _____ ug/ml = [(Sample Wt. _____ g) (10⁶) / Vol. of Sol. _____ ml]
EPA-M5 Acetone Residue Blank Spec. { 7.3 ug/ml

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	<u>0.1054</u>	<u>0.0762</u>	<u>0.0650</u>	<u>D-25</u>	

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job Cu prns Source # 1205 Waste Gas
Team Leader DUH Test Site Stack
Date Submitted 5-31-99 Date of Test 5-25-99
Test No. 11 No. of Runs Completed 3
Date of Analysis 5-31-99 Technician C. Halperin

Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml)			Conc. CO ₂ %v/v Dry	Conc. O ₂ %v/v Dry	F _o
			Zero Pt.	After CO ₂	After O ₂			
11/1	2471-82 B B F	1	0.00	2.10	18.80	2.10	16.70	
		2	0.00	2.10	18.80	2.10	16.70	
		Avg				2.10	16.70	
11/2	-83 B B F	1	0.00	2.10	18.90	2.10	16.80	
		2	0.00	2.10	18.90	2.10	16.80	
		Avg				2.10	16.80	
11/3	-84 B B F	1	0.00	2.00	18.70	2.00	16.70	
		2	0.00	2.00	18.70	2.00	16.70	
		Avg				2.00	16.70	
	B B F	1						
		2						
		Avg						
	B B F	1						
		2						
		Avg						
	B B F	1						
		2						
		Avg						
	B B F	1						
		2						
		Avg						
	B B F	1						
		2						
		Avg						
	B B F	1						
		2						
		Avg						
	B B F	1						
		2						
		Avg						

- ☒ Ambient Air QA Check
☒ Orsat Analyzer System Leak Check
☐ F_o Within EPA M-3 Guidelines
for fuel type.

Where $F_o = \frac{20.9 - O_2}{CO_2}$

EPA Method 3 Guidelines

Fuel Type	F _o Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.600-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

F=Flask (250 cc all glass)
B=Tedlar Bag (5-layer)

D-3

ISC-04-BR

Interpoll Laboratories
(612) 786-6020

EPA Method 3 Data Reporting Sheet
Orsat Analysis

Job Cyprus

Team Leader DVB

Date Submitted 5-31-94

Test No. 1

Date of Analysis 5-31-94

Source #2 Boiler

Test Site Stack

Date of Test 5-26-94

No. of Runs Completed 3

Technician C. H. Jackson

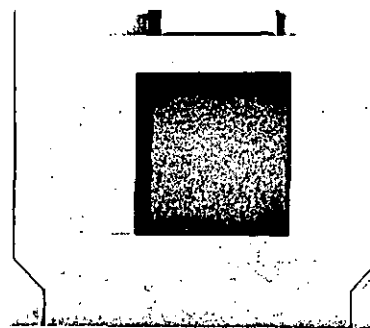
Test/ Run	Sample Log Number and Type	No. of An.	Buret Readings (ml)			Conc. CO ₂ %v/v Dry	Conc. O ₂ %v/v Dry	F _o
			Zero Pt.	After CO ₂	After O ₂			
17/1	<u>2971-68</u> ☒ B ☐ F	1	0.00	9.90	19.90	9.90	10.00	1.10
		2	0.00	9.90	19.90	9.90	10.00	1.10
		Avg				9.90	10.00	
17/2	<u>-69</u> ☒ B ☐ F	1	0.00	9.90	19.90	9.90	10.00	1.10
		2	0.00	9.90	19.90	9.90	10.00	1.10
		Avg				9.90	10.00	
17/3	<u>-70</u> ☒ B ☐ F	1	0.00	9.10	20.10	9.10	11.00	1.09
		2	0.00	9.10	20.10	9.10	11.00	1.09
		Avg				9.10	11.00	
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						
	☐ B ☐ F	1						
		2						
		Avg						

- ☒ Ambient Air QA Check
☒ Orsat Analyzer System Leak Check
☐ F_o Within EPA M-3 Guidelines
for fuel type.

Where $F_o = \frac{20.9 - O_2}{CO_2}$

EPA Method 3 Guidelines	
Fuel Type	F _o Range
Coal:	
Anthracite/Lignite	1.016-1.130
Bituminous	1.083-1.230
Oil:	
Distillate	1.260-1.413
Residual	1.210-1.370
Gas:	
Natural	1.400-1.836
Propane	1.434-1.586
Butane	1.405-1.553
Wood/Wood Bark	1.000-1.130

F=Flask (250 cc all glass)
B=Tedlar Bag (5-layer)



Interpoll Laboratories
(612) 796-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Cyprus Source Hood exhaust
Team Leader Mc Test Site Inlet
Date Submitted 5-31-94 Date of Test 5-24-94
Test No. 7 No. of Runs Completed 3
Date of Analysis 6-17-94 Technician C. Gierke
Transport Leakage ☒ None ☐ ml Solvent Acetone

Test <u> </u> Run <u>0</u>	Dish No. <u> </u>
Field Blank	Dish Tare Wt. <u> </u> g
Log Number <u> </u>	Dish+Sample Wt. <u> </u> g
Vol. of Solvent <u> </u> ml	Sample Wt. <u> </u> g
*Solvent Residue <u>3.64</u> ug/ml	
Test <u>7</u> Run <u>1</u>	Dish No. <u>4</u>
Vol. of Solvent <u>40</u> ml	Dish Tare Wt. <u>47.3812</u> g
Log Number <u>2911 -16P</u>	Dish+Sample Wt. <u>47.4072</u> g
Comments <u> </u>	Sample Wt. <u>0.0260</u> g
Test <u>7</u> Run <u>2</u>	Dish No. <u>209</u>
Vol. of Solvent <u>40</u> ml	Dish Tare Wt. <u>43.2121</u> g
Log Number <u>-17P</u>	Dish+Sample Wt. <u>43.2266</u> g
Comments <u> </u>	Sample Wt. <u>0.0145</u> g
Test <u>7</u> Run <u>3</u>	Dish No. <u>411</u>
Vol. of Solvent <u>60</u> ml	Dish Tare Wt. <u>46.6860</u> g
Log Number <u>-18P</u>	Dish+Sample Wt. <u>46.7111</u> g
Comments <u> </u>	Sample Wt. <u>0.0251</u> g
Test <u> </u> Run <u> </u>	Dish No. <u> </u>
Vol. of Solvent <u> </u> ml	Dish Tare Wt. <u> </u> g
Log Number <u> </u>	Dish+Sample Wt. <u> </u> g
Comments <u> </u>	Sample Wt. <u> </u> g
Test <u> </u> Run <u> </u>	Dish No. <u> </u>
Vol. of Solvent <u> </u> ml	Dish Tare Wt. <u> </u> g
Log Number <u> </u>	Dish+Sample Wt. <u> </u> g
Comments <u> </u>	Sample Wt. <u> </u> g

*Solvent Residue ug/ml = [(Sample Wt. g) (10⁶)] / Vol. of Sol. ml
EPA-M5 Acetone Residue Blank Spec. { 7.3 ug/ml

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0259	0.0144	0.0249	D-18	

LSC-01YR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Cyprus N.S. Source Hood Exhaust
Team Leader MK Test Site Inlet
Date Submitted 5-31-94 Date of Test 8-24-94
Test No. 1 No. of Runs Completed 3
Date of Analysis 6-22-94 Technician C. Helgeson

0	Test <u>1</u> Run <u>0</u> Field Blank Log Number <u>2971-01F</u> Comments _____	Filter No. <u>18</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>40.9282</u> g Filter+Sample Wt. <u>40.9282</u> g Sample Wt. <u>0.0000</u> g
1	Test <u>1</u> Run <u>1</u> Log Number <u>-02F</u> Comments _____	Filter No. <u>16</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>40.0099</u> g Filter+Sample Wt. <u>40.5805</u> g Sample Wt. <u>0.5706</u> g
2	Test <u>1</u> Run <u>2</u> Log Number <u>-03F</u> Comments _____	Filter No. <u>23</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>41.1621</u> g Filter+Sample Wt. <u>41.4125</u> g Sample Wt. <u>0.2504</u> g
3	Test <u>1</u> Run <u>3</u> Log Number <u>-04F</u> Comments _____	Filter No. <u>29</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>40.9639</u> g Filter+Sample Wt. <u>41.2412</u> g Sample Wt. <u>0.2773</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.5706	0.2504	0.2773		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.5787	0.2629	0.2912		

LSC-02PR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Cyprus N.S. Source #12 Head Vent
Team Leader ET Test Site Stack
Date Submitted 5-31-94 Date of Test 5-24-94
Test No. 2 No. of Runs Completed 3
Date of Analysis 6-22-94 Technician C. Helgeson

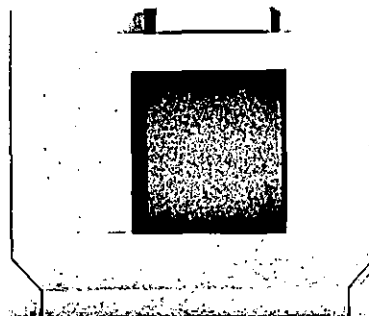
0	Test <u>2</u> Run <u>0</u> Field Blank Log Number <u>2971-05F</u> Comments _____	Filter No. <u>6566</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.8927</u> g Filter+Sample Wt. <u>.8928</u> g Sample Wt. <u>0.0001</u> g
1	Test <u>2</u> Run <u>1</u> Log Number <u>-06F</u> Comments _____	Filter No. <u>6565</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.8800</u> g Filter+Sample Wt. <u>.8882</u> g Sample Wt. <u>0.0082</u> g
2	Test <u>2</u> Run <u>2</u> Log Number <u>-07F</u> Comments _____	Filter No. <u>6567</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.8717</u> g Filter+Sample Wt. <u>.8814</u> g Sample Wt. <u>0.0097</u> g
3	Test <u>2</u> Run <u>3</u> Log Number <u>-08F</u> Comments _____	Filter No. <u>6569</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.8860</u> g Filter+Sample Wt. <u>.8971</u> g Sample Wt. <u>0.0111</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0082	0.0097	0.0111		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0209	0.0296	0.0314		

LSC-02PR



Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Cyprus N.S. Source #12 Pelletizer
Team Leader SB Test Site Roto Clone Stack
Date Submitted 5-31-94 Date of Test 5-24-94
Test No. 5 No. of Runs Completed 3
Date of Analysis 6-17-94 Technician C. Gierke
Transport Leakage ☒ None ☐ _____ ml Solvent Acetone

0	Test <u>S</u> Run <u>0</u> Field Blank Log Number <u>2971-09P</u> Vol. of Solvent <u>110</u> ml *Solvent Residue <u>364</u> ug/ml	Dish No. <u>26</u> Dish Tare Wt. <u>48.3862</u> g Dish+Sample Wt. <u>48.3866</u> g Sample Wt. <u>0.0004</u> g
1	Test <u>S</u> Run <u>1</u> Vol. of Solvent <u>90</u> ml Log Number <u>-10P</u> Comments _____	Dish No. <u>65</u> Dish Tare Wt. <u>44.6557</u> g Dish+Sample Wt. <u>45.0383</u> g Sample Wt. <u>0.3826</u> g
2	Test <u>S</u> Run <u>2</u> Vol. of Solvent <u>90</u> ml Log Number <u>-11P</u> Comments _____	Dish No. <u>105</u> Dish Tare Wt. <u>47.8667</u> g Dish+Sample Wt. <u>47.8773</u> g Sample Wt. <u>0.0106</u> g
3	Test <u>S</u> Run <u>3</u> Vol. of Solvent <u>70</u> ml Log Number <u>-12P</u> Comments _____	Dish No. <u>403</u> Dish Tare Wt. <u>47.0969</u> g Dish+Sample Wt. <u>47.1152</u> g Sample Wt. <u>0.0183</u> g
4	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

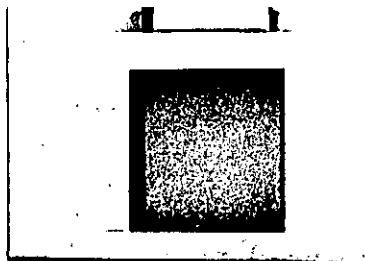
*Solvent Residue 364 ug/ml = [(Sample Wt. 0.0004 g) (10⁶)] / Vol. of Sol. 110 ml
EPA-M5 Acetone Residue Blank Spec. { 7.3 ug/ml

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	<u>0.3823</u>	<u>0.0103</u>	<u>0.0180</u>	<u>D-13</u>	

LSC-01YR



Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Cyprus N.S. Source #12 Pelletizer N. RotoClave
Team Leader RR Test Site Inlet
Date Submitted 5-31-94 Date of Test 5-24-94
Test No. 4 No. of Runs Completed 3
Date of Analysis 6-27-94 Technician C. Helson
Transport Leakage ☒ None ☐ _____ ml Solvent Acetone

Test <u>Run 0</u>	Dish No. _____
Field Blank	Dish Tare Wt. _____ g
Log Number _____	Dish+Sample Wt. _____ g
Vol. of Solvent _____ ml	Sample Wt. _____ g
*Solvent Residue <u>364</u> ug/ml	
Test <u>4</u> Run <u>1</u>	Dish No. <u>5</u>
Vol. of Solvent <u>75</u> ml	Dish Tare Wt. <u>50.6830</u> g
Log Number <u>2971- SOP</u>	Dish+Sample Wt. <u>51.1995</u> g
Comments _____	Sample Wt. <u>0.5165</u> g
Test <u>4</u> Run <u>2</u>	Dish No. <u>22</u>
Vol. of Solvent <u>140</u> ml	Dish Tare Wt. <u>51.3610</u> g
Log Number <u>-SIP</u>	Dish+Sample Wt. <u>51.9180</u> g
Comments _____	Sample Wt. <u>0.5570</u> g
Test <u>4</u> Run <u>3</u>	Dish No. <u>26</u>
Vol. of Solvent <u>80</u> ml	Dish Tare Wt. <u>48.3856</u> g
Log Number <u>-SIP</u>	Dish+Sample Wt. <u>49.2574</u> g
Comments _____	Sample Wt. <u>0.8718</u> g
Test _____ Run _____	Dish No. _____
Vol. of Solvent _____ ml	Dish Tare Wt. _____ g
Log Number _____	Dish+Sample Wt. _____ g
Comments _____	Sample Wt. _____ g
Test _____ Run _____	Dish No. _____
Vol. of Solvent _____ ml	Dish Tare Wt. _____ g
Log Number _____	Dish+Sample Wt. _____ g
Comments _____	Sample Wt. _____ g

*Solvent Residue _____ ug/ml = (Sample Wt. _____ g) (10⁶) / Vol. of Sol. _____ ml
EPA-M5 Acetone Residue Blank Spec. (7.3 ug/ml)

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.5162	0.5565	0.8715	0-10	

LSC-01YR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Cyprus N.S. Source # 12 Pelletizer North Rotoclosure
Team Leader RR Test Site Inlet
Date Submitted 3-31-94 Date of Test 5-24-94
Test No. 4 No. of Runs Completed 3
Date of Analysis 6-23-94 Technician C. Helgeson

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>4</u> Run <u>1</u> Log Number <u>2971- S0F</u> Comments _____	Filter No. <u>14</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>37.9933</u> g Filter+Sample Wt. <u>38.7796</u> g Sample Wt. <u>0.7863</u> g
2	Test <u>4</u> Run <u>2</u> Log Number <u>S1F</u> Comments _____	Filter No. <u>17</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>40.4403</u> g Filter+Sample Wt. <u>41.1115</u> g Sample Wt. <u>0.6712</u> g
3	Test <u>4</u> Run <u>3</u> Log Number <u>S2F</u> Comments _____	Filter No. <u>19</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>40.1607</u> g Filter+Sample Wt. <u>41.1021</u> g Sample Wt. <u>0.9414</u> g
4	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.7863	0.6712	0.9414		

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	1.3025	1.2277	1.8129		

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Cyprus N.S. Source #12 Pelletizer
Team Leader SB Test Site Roto Clow Stack
Date Submitted 5-31-94 Date of Test 5-24-94
Test No. 5 No. of Runs Completed 3
Date of Analysis 6-22-94 Technician C. Helgeson

0	Test <u>5</u> Run <u>0</u> Field Blank Log Number <u>2971-09F</u> Comments _____	Filter No. <u>6638</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.9378</u> g Filter+Sample Wt. <u>.9380</u> g Sample Wt. <u>0.0002</u> g
1	Test <u>5</u> Run <u>1</u> Log Number <u>-10F</u> Comments _____	Filter No. <u>6573</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.8886</u> g Filter+Sample Wt. <u>.9137</u> g Sample Wt. <u>0.0251</u> g
2	Test <u>5</u> Run <u>2</u> Log Number <u>-11F</u> Comments _____	Filter No. <u>6574</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.8881</u> g Filter+Sample Wt. <u>.8980</u> g Sample Wt. <u>0.0099</u> g
3	Test <u>5</u> Run <u>3</u> Log Number <u>-12F</u> Comments _____	Filter No. <u>6575</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.8832</u> g Filter+Sample Wt. <u>.9176</u> g Sample Wt. <u>0.0344</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0251	0.0099	0.0344		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.4095	0.0208	0.0549		

LSC-02PR

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EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job Cypress Northshore Source ND 12 PCell 6200
Team Leader 30 Test Site Rotating Stack
Date Submitted 5-31-94 Date of Test 5/24/94
Test No. 5 No. of Runs Completed 3
Date of Analysis 6/25/94 Technician TM

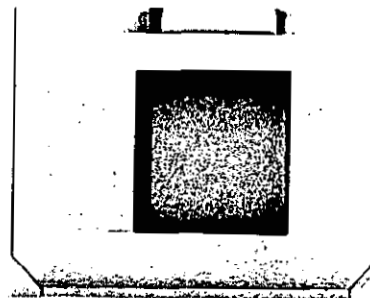
0	Test <u>5</u> Run <u>0</u> Field Blank Log Number <u>2971-</u> <u>-09I</u> Comments _____	Dish No. <u>294</u> Dish Tare Wt. <u>44.2911</u> g Dish+Sample Wt. <u>44.2914</u> g Sample Wt. <u>0.0003</u> g
1	Test <u>5</u> Run <u>1</u> Log Number _____ <u>-10I</u> Comments _____	Dish No. <u>325</u> Dish Tare Wt. <u>47.6638</u> g Dish+Sample Wt. <u>47.6662</u> g Sample Wt. <u>0.0024</u> g
2	Test <u>5</u> Run <u>2</u> Log Number _____ <u>-11I</u> Comments _____	Dish No. <u>610</u> Dish Tare Wt. <u>48.4381</u> g Dish+Sample Wt. <u>48.4390</u> g Sample Wt. <u>0.0009</u> g
3	Test <u>5</u> Run <u>3</u> Log Number _____ <u>-12I</u> Comments _____	Dish No. <u>611</u> Dish Tare Wt. <u>50.0108</u> g Dish+Sample Wt. <u>50.0136</u> g Sample Wt. <u>0.0028</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

Blank Solvent Wt. _____ g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0021	0.0006	0.0025	D-12	



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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Cyprus Source #12 Hood Vent
Team Leader ET Test Site Stack
Date Submitted 6-31-94 Date of Test 5-24-94
Test No. 2 No. of Runs Completed 3
Date of Analysis 6-22-94 Technician C. Helgeson
Transport Leakage ☒ None ☐ _____ ml Solvent Acetone

0	Test <u>2</u> Run <u>0</u> Field Blank Log Number <u>2971-OSP</u> Vol. of Solvent <u>110</u> ml *Solvent Residue <u>3.64</u> ug/ml	Dish No. <u>206</u> Dish Tare Wt. <u>47.8195</u> g Dish+Sample Wt. <u>47.8199</u> g Sample Wt. <u>0.0004</u> g
1	Test <u>2</u> Run <u>1</u> Vol. of Solvent <u>160</u> ml Log Number <u>-06P</u> Comments _____	Dish No. <u>322</u> Dish Tare Wt. <u>44.2285</u> g Dish+Sample Wt. <u>44.2403</u> g Sample Wt. <u>0.0118</u> g
2	Test <u>2</u> Run <u>2</u> Vol. of Solvent <u>200</u> ml Log Number <u>-07P</u> Comments _____	Dish No. <u>323</u> Dish Tare Wt. <u>43.4736</u> g Dish+Sample Wt. <u>43.4927</u> g Sample Wt. <u>0.0191</u> g
3	Test <u>2</u> Run <u>3</u> Vol. of Solvent <u>130</u> ml Log Number <u>-08P</u> Comments _____	Dish No. <u>404</u> Dish Tare Wt. <u>47.6424</u> g Dish+Sample Wt. <u>47.6623</u> g Sample Wt. <u>0.0199</u> g
4	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

*Solvent Residue 3.44 ug/ml = [(Sample Wt. 0.0004 g) (10⁶) / Vol. of Sol. 110 ml]
EPA-M5 Acetone Residue Blank Spec. { 7.3 ug/ml

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0112	0.0184	0.0194	D-8	

LSC-01YR

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Cyprus N.S. Source #12 Head Vent
Team Leader ET Test Site Stack
Date Submitted 5-31-94 Date of Test 5-24-94
Test No. 6 No. of Runs Completed 3
Date of Analysis 6-22-94 Technician C. Haljeson

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>6</u> Run <u>1</u> Log Number <u>2971-13F</u> Comments _____	Filter No. <u>6568</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.8868</u> g Filter+Sample Wt. <u>.9019</u> g Sample Wt. <u>0.0151</u> g
2	Test <u>6</u> Run <u>2</u> Log Number <u>-14I</u> Comments _____	Filter No. <u>6570</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.8926</u> g Filter+Sample Wt. <u>.9053</u> g Sample Wt. <u>0.0127</u> g
3	Test <u>6</u> Run <u>3</u> Log Number <u>-15I</u> Comments _____	Filter No. <u>6571</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.8855</u> g Filter+Sample Wt. <u>.8977</u> g Sample Wt. <u>0.0122</u> g
4	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0151	0.0127	0.0122		

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0300	0.0262	0.0307		

LSC-02PR

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EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job Cyprus N.S. Source #12 Hood Vent
 Team Leader ET Test Site Stack
 Date Submitted 5-31-94 Date of Test 5-24-94
 Test No. 6 No. of Runs Completed 3
 Date of Analysis 6-28-94 Technician TTM

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>6 Run 1</u> Log Number <u>2971-13 F</u> Comments _____	Dish No. <u>322</u> Dish Tare Wt. <u>44.2278</u> g Dish+Sample Wt. <u>44.2291</u> g Sample Wt. <u>0.0013</u> g
2	Test <u>6 Run 2</u> Log Number <u>-14 I</u> Comments _____	Dish No. <u>323</u> Dish Tare Wt. <u>43.4727</u> g Dish+Sample Wt. <u>43.4746</u> g Sample Wt. <u>0.0019</u> g
3	Test <u>6 Run 3</u> Log Number <u>-15 I</u> Comments _____	Dish No. <u>340</u> Dish Tare Wt. <u>47.9154</u> g Dish+Sample Wt. <u>47.9181</u> g Sample Wt. <u>0.0027</u> g
4	Test <u>Run</u> Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test <u>Run</u> Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

Blank Solvent Wt. 0.003 g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0010	0.0016	0.0024	D-15	

LSC-03.GR

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EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job Cypress Northshore Source NO. 12 Hood Vent
Team Leader ET Test Site Stack
Date Submitted 5-31-94 Date of Test 5-24-94
Test No. 2 No. of Runs Completed 3
Date of Analysis 6/29/94 Technician TTM

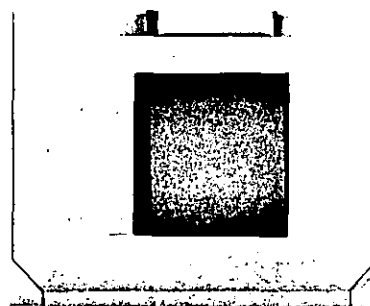
0	Test <u>2</u> Run <u>0</u>	Dish No. <u>2</u>
	Field Blank	Dish Tare Wt. <u>45.1631</u> g
1	Log Number <u>2971-05I</u>	Dish+Sample Wt. <u>45.1634</u> g
	Comments	Sample Wt. <u>0.0003</u> g
	Test <u>2</u> Run <u>1</u>	Dish No. <u>311</u>
	Log Number <u>-06I</u>	Dish Tare Wt. <u>43.8116</u> g
2	Comments	Dish+Sample Wt. <u>43.8134</u> g
		Sample Wt. <u>0.0018</u> g
	Test <u>2</u> Run <u>2</u>	Dish No. <u>313</u>
	Log Number <u>-08I</u>	Dish Tare Wt. <u>46.4583</u> g
3	Comments	Dish+Sample Wt. <u>46.4601</u> g
		Sample Wt. <u>0.0018</u> g
	Test <u>2</u> Run <u>3</u>	Dish No. <u>314</u>
	Log Number <u>-08I</u>	Dish Tare Wt. <u>44.0343</u> g
4	Comments	Dish+Sample Wt. <u>44.0355</u> g
		Sample Wt. <u>0.0012</u> g
	Test <u> </u> Run <u> </u>	Dish No. <u> </u>
	Log Number <u> </u>	Dish Tare Wt. <u> </u> g
5	Comments <u> </u>	Dish+Sample Wt. <u> </u> g
		Sample Wt. <u> </u> g

Blank Solvent Wt. g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0015	0.0015	0.0009	D-7	



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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Cyprus Source Hood exhaust
Team Leader MC Test Site Inlet
Date Submitted 5-31-94 Date of Test 5-24-94
Test No. 1 No. of Runs Completed 3
Date of Analysis 6-17-94 Technician C. GIERKE
Transport Leakage ☒ None ☐ _____ ml Solvent Acetone

Test <u>1</u> Run <u>0</u> Field Blank Log Number <u>2971 - 01P</u> Vol. of Solvent <u>110</u> ml *Solvent Residue <u>3.64</u> ug/ml	Dish No. <u>64</u> Dish Tare Wt. <u>43.1463</u> g Dish+Sample Wt. <u>43.1467</u> g Sample Wt. <u>0.0004</u> g
Test <u>1</u> Run <u>1</u> Vol. of Solvent <u>30</u> ml Log Number <u>-02P</u> Comments _____	Dish No. <u>119</u> Dish Tare Wt. <u>47.7690</u> g Dish+Sample Wt. <u>47.7772</u> g Sample Wt. <u>0.0082</u> g
Test <u>1</u> Run <u>2</u> Vol. of Solvent <u>30</u> ml Log Number <u>-03P</u> Comments _____	Dish No. <u>203</u> Dish Tare Wt. <u>46.8709</u> g Dish+Sample Wt. <u>46.8836</u> g Sample Wt. <u>0.0127</u> g
Test <u>1</u> Run <u>3</u> Vol. of Solvent <u>60</u> ml Log Number <u>-04P</u> Comments _____	Dish No. <u>312</u> Dish Tare Wt. <u>45.2376</u> g Dish+Sample Wt. <u>45.2517</u> g Sample Wt. <u>0.0141</u> g
Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

*Solvent Residue _____ ug/ml = [(Sample Wt. _____ g) (10⁶)] / Vol. of Sol. _____ ml
EPA-M5 Acetone Residue Blank Spec. { 7.3 ug/ml

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0081	0.0125	0.0139	D-5	

LSC-01YR

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Cyprus N.S. Source Hood Exhaust
Team Leader MK Test Site Inlet
Date Submitted 5-31-94 Date of Test 5-24-94
Test No. 7 No. of Runs Completed 3
Date of Analysis 6-22-94 Technician C. Helgeson

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>7</u> Run <u>1</u> Log Number <u>2971-16F</u> Comments _____	Filter No. <u>7</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>39.9784</u> g Filter+Sample Wt. <u>40.2464</u> g Sample Wt. <u>0.2680</u> g
2	Test <u>7</u> Run <u>2</u> Log Number <u>-17F</u> Comments _____	Filter No. <u>38</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>43.3826</u> g Filter+Sample Wt. <u>43.8584</u> g Sample Wt. <u>0.4758</u> g
3	Test <u>7</u> Run <u>3</u> Log Number <u>-18F</u> Comments _____	Filter No. <u>41</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>40.5522</u> g Filter+Sample Wt. <u>40.7921</u> g Sample Wt. <u>0.2399</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.2680	0.4758	0.2399		

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.2939	0.4902	0.2648		

Interpoll Laboratories
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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Cyprus N.S. Source Waste Gas Unit
Team Leader Mk Test Site Inlet
Date Submitted 5-31-94 Date of Test 5-25-94
Test No. 8 No. of Runs Completed 3
Date of Analysis 6-23-94 Technician C. Helgeson
Transport Leakage ☒ None ☐ _____ ml Solvent MeCl₂

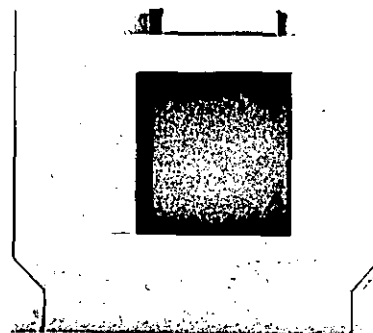
0	Test <u>8</u> Run <u>0</u> Field Blank Log Number <u>2976-71P</u> Vol. of Solvent <u>110</u> ml *Solvent Residue <u>3.64</u> ug/ml	Dish No. <u>39</u> Dish Tare Wt. <u>49.4389</u> g Dish+Sample Wt. <u>49.4392</u> g Sample Wt. <u>0.0004</u> g
1	Test <u>8</u> Run <u>1</u> Vol. of Solvent <u>130</u> ml Log Number <u>-73P</u> Comments _____	Dish No. <u>52</u> Dish Tare Wt. <u>50.8903</u> g Dish+Sample Wt. <u>50.9943</u> g Sample Wt. <u>0.1013</u> g
2	Test <u>8</u> Run <u>2</u> Vol. of Solvent <u>130</u> ml Log Number <u>-74P</u> Comments _____	Dish No. <u>601</u> Dish Tare Wt. <u>47.6663</u> g Dish+Sample Wt. <u>47.7291</u> g Sample Wt. <u>0.0628</u> g
3	Test <u>8</u> Run <u>3</u> Vol. of Solvent <u>155</u> ml Log Number <u>-75P</u> Comments _____	Dish No. <u>604</u> Dish Tare Wt. <u>50.1451</u> g Dish+Sample Wt. <u>50.1994</u> g Sample Wt. <u>0.0543</u> g
4	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

*Solvent Residue 3.64 ug/ml = [(Sample Wt. 0.0004 g) (10⁶) / Vol. of Sol. 110 ml]
EPA-M5 Acetone Residue Blank Spec. { 7.3 ug/ml

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	<u>0.1008</u>	<u>0.0623</u>	<u>0.0537</u>	<u>D-20</u>	



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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Cyprus Source Waste gas unit
Team Leader MC Test Site Inlet
Date Submitted 5-31-94 Date of Test 5-25-94
Test No. 9 No. of Runs Completed 3
Date of Analysis 6-17-94 Technician C. Gierke
Transport Leakage ☒ None ☐ _____ ml Solvent Acetone

Test <u>Run 0</u> Field Blank Log Number _____ Vol. of Solvent _____ ml *Solvent Residue <u>3.64</u> ug/ml	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
Test <u>9</u> Run <u>1</u> Vol. of Solvent <u>170</u> ml Log Number <u>2911-19P</u> Comments _____	Dish No. <u>41</u> Dish Tare Wt. <u>45.3247</u> g Dish+Sample Wt. <u>45.4430</u> g Sample Wt. <u>0.1183</u> g
Test <u>9</u> Run <u>2</u> Vol. of Solvent <u>170</u> ml Log Number <u>-20P</u> Comments _____	Dish No. <u>63</u> Dish Tare Wt. <u>50.4232</u> g Dish+Sample Wt. <u>50.5027</u> g Sample Wt. <u>0.0795</u> g
Test <u>9</u> Run <u>3</u> Vol. of Solvent <u>130</u> ml Log Number <u>-21P</u> Comments _____	Dish No. <u>200</u> Dish Tare Wt. <u>44.9451</u> g Dish+Sample Wt. <u>45.0070</u> g Sample Wt. <u>0.0619</u> g
Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

*Solvent Residue _____ ug/ml = [(Sample Wt. _____ g) (10⁶)] / Vol. of Sol. _____ ml
EPA-M5 Acetone Residue Blank Spec. (7.3 ug/ml)

Results:
Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.1177	0.0789	0.0614	D-22	

LSC-01YR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Cyprus N.S. Source Waste Gas Unit
Team Leader MK Test Site Inlet
Date Submitted 5-31-94 Date of Test 5-25-94
Test No. 8 No. of Runs Completed 3
Date of Analysis 6-23-94 Technician C. Helgeson

0	Test <u>8</u> Run <u>0</u> Field Blank Log Number <u>2971-71F</u> Comments _____	Filter No. <u>37</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>41.9324</u> g Filter+Sample Wt. <u>41.9326</u> g Sample Wt. <u>0.0002</u> g
1	Test <u>8</u> Run <u>1</u> Log Number <u>73 F</u> Comments _____	Filter No. <u>36</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>43.352</u> g Filter+Sample Wt. <u>43.6713</u> g Sample Wt. <u>0.3161</u> g
2	Test <u>8</u> Run <u>2</u> Log Number <u>74 F</u> Comments _____	Filter No. <u>35</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>42.0361</u> g Filter+Sample Wt. <u>42.3042</u> g Sample Wt. <u>0.2681</u> g
3	Test <u>8</u> Run <u>3</u> Log Number <u>75 F</u> Comments _____	Filter No. <u>36</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>42.1474</u> g Filter+Sample Wt. <u>42.3026</u> g Sample Wt. <u>0.1552</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.3161	0.2681	0.1552		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.4169	0.3304	0.2089		

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Cyprus N.S. Source Waste Gas Unit
Team Leader MK Test Site Inlet
Date Submitted 5-31-94 Date of Test 5-25-94
Test No. 9 No. of Runs Completed 3
Date of Analysis 6-22-94 Technician C. Helgeson

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>9</u> Run <u>1</u> Log Number <u>2971-19F</u> Comments _____	Filter No. <u>24</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>40.7499</u> g Filter+Sample Wt. <u>41.1500</u> g Sample Wt. <u>0.4001</u> g
2	Test <u>9</u> Run <u>2</u> Log Number <u>-20F</u> Comments _____	Filter No. <u>28</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>41.2417</u> g Filter+Sample Wt. <u>41.4543</u> g Sample Wt. <u>0.2126</u> g
3	Test <u>9</u> Run <u>3</u> Log Number <u>-21F</u> Comments _____	Filter No. <u>26</u> Filter Type <u>SS Thimble</u> Filter Tare Wt. <u>41.1317</u> g Filter+Sample Wt. <u>41.5296</u> g Sample Wt. <u>0.3979</u> g
4	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.4001	0.2126	0.3979		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.5178	0.2915	0.4593		

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Cyprus N.S. Source #1204 Waste Gas
Team Leader ET Test Site Stack
Date Submitted 5-31-94 Date of Test 5-25-94
Test No. 10 No. of Runs Completed 3
Date of Analysis 6-22-94 Technician C. Helgeson

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>10</u> Run <u>1</u> Log Number <u>2971-22F</u> Comments _____	Filter No. <u>6572</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.8890</u> g Filter+Sample Wt. <u>.9025</u> g Sample Wt. <u>0.0135</u> g
2	Test <u>10</u> Run <u>2</u> Log Number <u>-23F</u> Comments _____	Filter No. <u>5620</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.9168</u> g Filter+Sample Wt. <u>.9300</u> g Sample Wt. <u>0.0132</u> g
3	Test <u>10</u> Run <u>3</u> Log Number <u>-24F</u> Comments _____	Filter No. <u>5621</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.9194</u> g Filter+Sample Wt. <u>.9315</u> g Sample Wt. <u>0.0121</u> g
4	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.0135	0.0132	0.0121		

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5
	0.1247	0.0939	0.0795		

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Cyprus N.S. Source #1204 waste Gas
Team Leader ET Test Site Stack
Date Submitted 5-31-94 Date of Test 5-25-94
Test No. 12 No. of Runs Completed 3
Date of Analysis 6-22-94 Technician C. Helgeson

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>12</u> Run <u>1</u> Log Number <u>2971-25 F</u> Comments _____	Filter No. <u>5622</u> Filter Type <u>4" GF</u> Filter Tare Wt. <u>.9161</u> g Filter+Sample Wt. <u>.9282</u> g Sample Wt. <u>0.0121</u> g
2	Test <u>12</u> Run <u>2</u> Log Number <u>-26 F</u> Comments _____	Filter No. <u>5623</u> Filter Type <u>4" GF</u> Filter Tare Wt. <u>.9260</u> g Filter+Sample Wt. <u>.9377</u> g Sample Wt. <u>0.0117</u> g
3	Test <u>12</u> Run <u>3</u> Log Number <u>-27 F</u> Comments _____	Filter No. <u>5624</u> Filter Type <u>4" GF</u> Filter Tare Wt. <u>.9228</u> g Filter+Sample Wt. <u>.9351</u> g Sample Wt. <u>0.0123</u> g
4	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0121	0.0117	0.0123		

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.1051	0.1313	0.0882		

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EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job Cyprus North Shore Source NO 1204 Waste Gas
Team Leader ET Test Site SEACK
Date Submitted 5-31-94 Date of Test 5/29/94
Test No. 10 No. of Runs Completed 3
Date of Analysis 6/23/94 Technician TM

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>10</u> Run <u>1</u> Log Number <u>2971 - 22I</u> Comments _____	Dish No. <u>36</u> Dish Tare Wt. <u>43.5640</u> g Dish+Sample Wt. <u>43.5701</u> g Sample Wt. <u>0.0061</u> g
2	Test <u>10</u> Run <u>2</u> Log Number <u>-23I</u> Comments _____	Dish No. <u>205</u> Dish Tare Wt. <u>47.810</u> g Dish+Sample Wt. <u>47.8238</u> g Sample Wt. <u>0.0048</u> g
3	Test <u>10</u> Run <u>3</u> Log Number <u>-24I</u> Comments _____	Dish No. <u>519</u> Dish Tare Wt. <u>49.0534</u> g Dish+Sample Wt. <u>49.0561</u> g Sample Wt. <u>0.0027</u> g
4	Test <u>Run</u> Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test <u>Run</u> Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

Blank Solvent Wt. 0.0003 g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0058	0.0045	0.0024	D-24	

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EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job Cypress Northshore Source NO. 1204 Waste Gas Stack
Team Leader ET Test Site Stack
Date Submitted 5-31-94 Date of Test 5/25/94
Test No. 12 No. of Runs Completed 3
Date of Analysis 6/28/94 Technician JTM

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>12</u> Run <u>1</u> Log Number <u>2771 - 25I</u> Comments _____	Dish No. <u>19</u> Dish Tare Wt. <u>48.9574</u> g Dish+Sample Wt. <u>48.9599</u> g Sample Wt. <u>0.0025</u> g
2	Test <u>12</u> Run <u>2</u> Log Number <u>- 26Z</u> Comments _____	Dish No. <u>115</u> Dish Tare Wt. <u>45.0697</u> g Dish+Sample Wt. <u>45.0704</u> g Sample Wt. <u>0.0015</u> g
3	Test <u>12</u> Run <u>3</u> Log Number <u>- 27Z</u> Comments _____	Dish No. <u>411</u> Dish Tare Wt. <u>46.6850</u> g Dish+Sample Wt. <u>46.6891</u> g Sample Wt. <u>0.0041</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

Blank Solvent Wt. 0.003 g

*Solve

EPA-Results:

Result'd Blk.

Field B

Run 1

Run 2

Run 3

Run 4

Run 5

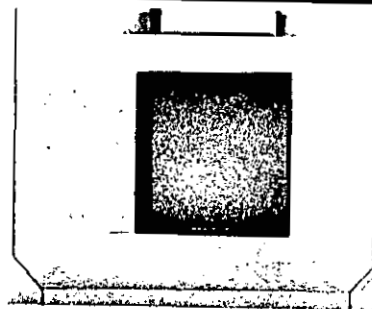
0.0022

0.0012

0.0038

D-27

LSC-03



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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Cyprus N.S. Source #1104 Pelletizer
Team Leader MK Test Site Stack
Date Submitted 5-31-94 Date of Test 5-26-94
Test No. 15 No. of Runs Completed 3
Date of Analysis 6-23-94 Technician C. Helgeson
Transport Leakage ☒ None ☐ ml Solvent Acetone

Test <u> </u> Run <u>0</u> Field Blank Log Number <u> </u> Vol. of Solvent <u> </u> ml *Solvent Residue <u>3.64</u> ug/ml	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u> </u> g
Test <u>15</u> Run <u>1</u> Vol. of Solvent <u>100</u> ml Log Number <u>2971- 29P</u> Comments <u> </u>	Dish No. <u>6</u> Dish Tare Wt. <u>48.2717</u> g Dish+Sample Wt. <u>48.3401</u> g Sample Wt. <u>0.0684</u> g
Test <u>15</u> Run <u>2</u> Vol. of Solvent <u>150</u> ml Log Number <u>-30 P</u> Comments <u> </u>	Dish No. <u>508</u> Dish Tare Wt. <u>46.5054</u> g Dish+Sample Wt. <u>46.7500</u> g Sample Wt. <u>0.2446</u> g
Test <u>15</u> Run <u>3</u> Vol. of Solvent <u>110</u> ml Log Number <u>-31P</u> Comments <u> </u>	Dish No. <u>512</u> Dish Tare Wt. <u>49.3585</u> g Dish+Sample Wt. <u>49.3713</u> g Sample Wt. <u>0.0128</u> g
Test <u> </u> Run <u> </u> Vol. of Solvent <u> </u> ml Log Number <u> </u> Comments <u> </u>	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u> </u> g
Test <u> </u> Run <u> </u> Vol. of Solvent <u> </u> ml Log Number <u> </u> Comments <u> </u>	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u> </u> g

*Solvent Residue ug/ml = [(Sample Wt. g) (10⁴) / Vol. of Sol. ml]
EPA-M5 Acetone Residue Blank Spec. { 7.3 ug/ml

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0680	0.2441	0.0124	D-31	

LSC-01YR

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Cyprus N.S. Source # 1104 Pellitizer
Team Leader MK Test Site Stack
Date Submitted 5-31-94 Date of Test 5-26-94
Test No. 15 No. of Runs Completed 3
Date of Analysis 6-23-94 Technician C. Helgeson

0	Test <u>15</u> Run <u>0</u> Field Blank Log Number <u>2971-28F</u> Comments _____	Filter No. <u>6685</u> Filter Type <u>4"GF</u> Filter Tare Wt. <u>.9491</u> g Filter+Sample Wt. <u>.9493</u> g Sample Wt. <u>0.0002</u> g
1	Test <u>15</u> Run <u>1</u> Log Number <u>-29F</u> Comments _____	Filter No. <u>5632</u> Filter Type <u>4"GF</u> Filter Tare Wt. <u>.9317</u> g Filter+Sample Wt. <u>.9401</u> g Sample Wt. <u>0.0084</u> g
2	Test <u>15</u> Run <u>2</u> Log Number <u>-30F</u> Comments _____	Filter No. <u>5633</u> Filter Type <u>4"GF</u> Filter Tare Wt. <u>.9290</u> g Filter+Sample Wt. <u>.9426</u> g Sample Wt. <u>0.0136</u> g
3	Test <u>15</u> Run <u>3</u> Log Number <u>-31F</u> Comments _____	Filter No. <u>5619</u> Filter Type <u>4"GF</u> Filter Tare Wt. <u>.9275</u> g Filter+Sample Wt. <u>.9435</u> g Sample Wt. <u>0.0160</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0084	0.0136	0.0160		

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0790	0.2586	0.0299		

LSC-02PR

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EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job Cypress Northshore Source NO. 1104 Pollitzer
Team Leader MX Test Site SEACK
Date Submitted 5-31-94 Date of Test 5/26/94
Test No. 15 No. of Runs Completed 3
Date of Analysis 6/29/94 Technician TTB

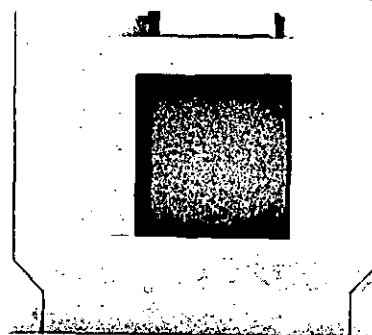
0	Test <u>15</u> Run <u>0</u>	Dish No. <u>2A</u>
	Field Blank	Dish Tare Wt. <u>47.0160</u> g
	Log Number <u>-28E</u>	Dish+Sample Wt. <u>47.0163</u> g
	Comments	Sample Wt. <u>0.0003</u> g
1	Test <u>15</u> Run <u>1</u>	Dish No. <u>10</u>
	Log Number <u>2971 -29E</u>	Dish Tare Wt. <u>48.2711</u> g
	Comments	Dish+Sample Wt. <u>48.2740</u> g
		Sample Wt. <u>0.0029</u> g
2	Test <u>15</u> Run <u>2</u>	Dish No. <u>38</u>
	Log Number <u>-30E</u>	Dish Tare Wt. <u>48.6500</u> g
	Comments	Dish+Sample Wt. <u>48.6512</u> g
		Sample Wt. <u>0.0012</u> g
3	Test <u>15</u> Run <u>3</u>	Dish No. <u>341</u>
	Log Number <u>-31E</u>	Dish Tare Wt. <u>47.6599</u> g
	Comments	Dish+Sample Wt. <u>47.6617</u> g
		Sample Wt. <u>0.0018</u> g
4	Test <u> </u> Run <u> </u>	Dish No. <u> </u>
	Log Number <u> </u>	Dish Tare Wt. <u> </u> g
	Comments <u> </u>	Dish+Sample Wt. <u> </u> g
		Sample Wt. <u> </u> g
5	Test <u> </u> Run <u> </u>	Dish No. <u> </u>
	Log Number <u> </u>	Dish Tare Wt. <u> </u> g
	Comments <u> </u>	Dish+Sample Wt. <u> </u> g
		Sample Wt. <u> </u> g

Blank Solvent Wt. 0.0003 g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0026	0.0009	0.0015	D-30	



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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Cyprus N.S. Source #1105 Pelletizer
Team Leader DUH Test Site Stack
Date Submitted 5-31-94 Date of Test 5-26-94
Test No. 16 No. of Runs Completed 3
Date of Analysis 6-23-94 Technician C. Helgeson
Transport Leakage ☒ None ☐ _____ ml Solvent Acetone

Test <u>16</u> Run <u>0</u> Field Blank Log Number <u>2971-32P</u> Vol. of Solvent <u>110</u> ml *Solvent Residue <u>3.64</u> ug/ml	Dish No. <u>340</u> Dish Tare Wt. <u>47.9128</u> g Dish+Sample Wt. <u>47.9132</u> g Sample Wt. <u>0.0004</u> g
Test <u>16</u> Run <u>1</u> Vol. of Solvent <u>110</u> ml Log Number <u>-33P</u> Comments _____	Dish No. <u>405</u> Dish Tare Wt. <u>48.4899</u> g Dish+Sample Wt. <u>48.5066</u> g Sample Wt. <u>0.0167</u> g
Test <u>16</u> Run <u>2</u> Vol. of Solvent <u>80</u> ml Log Number <u>-34P</u> Comments _____	Dish No. <u>410</u> Dish Tare Wt. <u>50.5572</u> g Dish+Sample Wt. <u>50.5699</u> g Sample Wt. <u>0.0127</u> g
Test <u>16</u> Run <u>3</u> Vol. of Solvent <u>90</u> ml Log Number <u>-35P</u> Comments _____	Dish No. <u>612</u> Dish Tare Wt. <u>49.6301</u> g Dish+Sample Wt. <u>49.7189</u> g Sample Wt. <u>0.0888</u> g
Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

Solvent Residue 3.64 ug/ml = [(Sample Wt. 0.0004 g) (10)] / Vol. of Sol. 110 ml
EPA-M5 Acetone Residue Blank Spec. (7.3 ug/ml)

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0163	0.0124	0.0885	D-34	

LSC-01YR

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EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Cyprus N.S. Source #1105 Pelletizer
Team Leader DUH Test Site Stack
Date Submitted 5-31-94 Date of Test 5-26-94
Test No. 16 No. of Runs Completed 3
Date of Analysis 6-23-94 Technician C. Helgeson

0	Test <u>16</u> Run <u>0</u> Field Blank Log Number <u>2971-32F</u> Comments _____	Filter No. <u>6526</u> Filter Type <u>4"GF</u> Filter Tare Wt. <u>.9350</u> g Filter+Sample Wt. <u>.9355</u> g Sample Wt. <u>0.0005</u> g
1	Test <u>16</u> Run <u>1</u> Log Number <u>-33F</u> Comments _____	Filter No. <u>5631</u> Filter Type <u>4"GF</u> Filter Tare Wt. <u>.9237</u> g Filter+Sample Wt. <u>.9373</u> g Sample Wt. <u>0.0136</u> g
2	Test <u>16</u> Run <u>2</u> Log Number <u>-34F</u> Comments _____	Filter No. <u>5618</u> Filter Type <u>4"GF</u> Filter Tare Wt. <u>.9306</u> g Filter+Sample Wt. <u>.9410</u> g Sample Wt. <u>0.0104</u> g
3	Test <u>16</u> Run <u>3</u> Log Number <u>-35F</u> Comments _____	Filter No. <u>6525</u> Filter Type <u>4"GF</u> Filter Tare Wt. <u>.9471</u> g Filter+Sample Wt. <u>.9609</u> g Sample Wt. <u>0.0138</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0136	0.0104	0.0138		

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0313	0.0257	0.1029		

LSC-02PR

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EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job Cyprus N.S. Source #1105 Pelletizer
Team Leader DUH Test Site Stack
Date Submitted 5-31-94 Date of Test 5-26-94
Test No. 16 No. of Runs Completed 3
Date of Analysis 6-29-94 Technician C. Helgeson

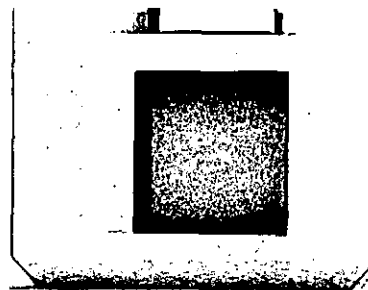
0	Test <u>16</u> Run <u>0</u> Field Blank Log Number <u>2971-32 F</u> Comments _____	Dish No. <u>1A</u> Dish Tare Wt. <u>49.1674</u> g Dish+Sample Wt. <u>49.1677</u> g Sample Wt. <u>0.0003</u> g
1	Test <u>16</u> Run <u>1</u> Log Number <u>2971-33 F</u> Comments _____	Dish No. <u>1</u> Dish Tare Wt. <u>51.9728</u> g Dish+Sample Wt. <u>51.9745</u> g Sample Wt. <u>0.0017</u> g
2	Test <u>16</u> Run <u>2</u> Log Number <u>-34 F</u> Comments _____	Dish No. <u>17</u> Dish Tare Wt. <u>48.3927</u> g Dish+Sample Wt. <u>48.3959</u> g Sample Wt. <u>0.0032</u> g
3	Test <u>16</u> Run <u>3</u> Log Number <u>-35 F</u> Comments _____	Dish No. <u>175</u> Dish Tare Wt. <u>53.0304</u> g Dish+Sample Wt. <u>53.0313</u> g Sample Wt. <u>0.0009</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

Blank Solvent Wt. _____ g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0014	0.0029	0.0006	D-33	



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EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Cyprus N.S. Source Dry Cobber
Team Leader SB Test Site Stack
Date Submitted 5-31-94 Date of Test 5-26-94
Test No. 19 No. of Runs Completed 3
Date of Analysis 6-23-94 Technician C. Helgeson
Transport Leakage ☒ None ☐ _____ ml Solvent Acetone

Test Run 0
Field Blank
Log Number _____
Vol. of Solvent _____ ml
*Solvent Residue 3.64 ug/ml

Dish No. _____
Dish Tare Wt. _____ g
Dish+Sample Wt. _____ g
Sample Wt. _____ g

Test 19 Run 1
Vol. of Solvent 70 ml
Log Number 2971-36P
Comments _____

Dish No. 501
Dish Tare Wt. 47.2507 g
Dish+Sample Wt. 47.2575 g
Sample Wt. 0.0068 g

Test 19 Run 2
Vol. of Solvent 90 ml
Log Number -37P
Comments _____

Dish No. 19
Dish Tare Wt. 48.9575 g
Dish+Sample Wt. 48.9631 g
Sample Wt. 0.0056 g

Test 19 Run 3
Vol. of Solvent 100 ml
Log Number -38P
Comments _____

Dish No. 520
Dish Tare Wt. 48.5318 g
Dish+Sample Wt. 48.5373 g
Sample Wt. 0.0055 g

Test _____ Run _____
Vol. of Solvent _____ ml
Log Number _____
Comments _____

Dish No. _____
Dish Tare Wt. _____ g
Dish+Sample Wt. _____ g
Sample Wt. _____ g

Test _____ Run _____
Vol. of Solvent _____ ml
Log Number _____
Comments _____

Dish No. _____
Dish Tare Wt. _____ g
Dish+Sample Wt. _____ g
Sample Wt. _____ g

*Solvent Residue _____ ug/ml = [(Sample Wt. _____ g) (10⁶)] / Vol. of Sol. _____ ml
EPA-M5 Acetone Residue Blank Spec. { 7.3 ug/ml

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0065	0.0053	0.0051	D-37	

LSC-01YR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Cyprus N.S. Source Dry Cobber
Team Leader SB Test Site Stack
Date Submitted 5-31-94 Date of Test 5-26-94
Test No. 19 No. of Runs Completed 3
Date of Analysis 6-23-94 Technician C. Helgeson

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____g Filter+Sample Wt. _____g Sample Wt. _____g
1	Test <u>19</u> Run <u>1</u> Log Number <u>2971-36F</u> Comments _____	Filter No. <u>6643</u> Filter Type <u>4"GF</u> Filter Tare Wt. <u>.9326</u> g Filter+Sample Wt. <u>.9343</u> g Sample Wt. <u>0.0017</u> g
2	Test <u>19</u> Run <u>2</u> Log Number <u>-37F</u> Comments _____	Filter No. <u>6644</u> Filter Type <u>4"GF</u> Filter Tare Wt. <u>.9280</u> g Filter+Sample Wt. <u>.9294</u> g Sample Wt. <u>0.0014</u> g
3	Test <u>19</u> Run <u>3</u> Log Number <u>-38F</u> Comments _____	Filter No. <u>6645</u> Filter Type <u>4"GF</u> Filter Tare Wt. <u>.9390</u> g Filter+Sample Wt. <u>.9394</u> g Sample Wt. <u>0.0004</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____g Filter+Sample Wt. _____g Sample Wt. _____g
5	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____g Filter+Sample Wt. _____g Sample Wt. _____g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0017	0.0014	0.0004		

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0096	0.0084	0.0100		

LSC-02PR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job Cyprus N.S. Source Dry cobbler
Team Leader SB Test Site Stack
Date Submitted 5-31-94 Date of Test 5-26-94
Test No. 19 No. of Runs Completed 3
Date of Analysis 6-29-94 Technician C. Helgeson

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>19</u> Run <u>1</u> Log Number <u>2971-36I</u> Comments _____	Dish No. <u>4</u> Dish Tare Wt. <u>47.3813</u> g Dish+Sample Wt. <u>47.3830</u> g Sample Wt. <u>0.0017</u> g
2	Test <u>19</u> Run <u>2</u> Log Number <u>-37I</u> Comments _____	Dish No. <u>10</u> Dish Tare Wt. <u>47.5484</u> g Dish+Sample Wt. <u>47.5605</u> g Sample Wt. <u>0.0021</u> g
3	Test <u>19</u> Run <u>3</u> Log Number <u>-38I</u> Comments _____	Dish No. <u>23</u> Dish Tare Wt. <u>46.0854</u> g Dish+Sample Wt. <u>46.0902</u> g Sample Wt. <u>0.0048</u> g
4	Test <u>Run</u> _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test <u>Run</u> _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

Blank Solvent Wt. 0.0003 g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0014	0.0017	0.0045	D-36	

Interpoll Laboratories
(512) 796-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Cyprus N.S. Source #2 Fine Crusher
Team Leader RR Test Site Stack
Date Submitted 5-31-94 Date of Test 5-25-94
Test No. 20 No. of Runs Completed 3
Date of Analysis 6-23-94 Technician C. Helgeson
Transport Leakage ☒ None ☐ _____ ml Solvent Acetone

0	Test <u>20</u> Run <u>0</u> Field Blank Log Number <u>2971-39P</u> Vol. of Solvent <u>110</u> ml *Solvent Residue <u>3.64</u> ug/ml	Dish No. <u>28</u> Dish Tare Wt. <u>46.0434</u> g Dish+Sample Wt. <u>46.6438</u> g Sample Wt. _____ g
	Test <u>20</u> Run <u>1</u> Vol. of Solvent <u>50</u> ml Log Number <u>-40P</u> Comments _____	Dish No. <u>36</u> Dish Tare Wt. <u>43.5645</u> g Dish+Sample Wt. <u>42.5752</u> g Sample Wt. <u>0.0107</u> g
	Test <u>20</u> Run <u>2</u> Vol. of Solvent <u>40</u> ml Log Number <u>-41P</u> Comments _____	Dish No. <u>38</u> Dish Tare Wt. <u>48.6511</u> g Dish+Sample Wt. <u>48.6557</u> g Sample Wt. <u>0.0046</u> g
	Test <u>20</u> Run <u>3</u> Vol. of Solvent <u>50</u> ml Log Number <u>-42P</u> Comments _____	Dish No. <u>521</u> Dish Tare Wt. <u>50.5974</u> g Dish+Sample Wt. <u>50.6008</u> g Sample Wt. <u>0.0034</u> g
	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

*Solvent Residue _____ ug/ml = [(Sample Wt. _____ g) (10⁶)] / Vol. of Sol. _____ ml
EPA-MS Acetone Residue Blank Spec. { 7.3 ug/ml

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0105	0.0045	0.0033	D-40	

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Cypress N.S. Source #2 Fine Crusher
Team Leader RR Test Site Stack
Date Submitted 5-31-94 Date of Test 5-25-94
Test No. 20 No. of Runs Completed 3
Date of Analysis 6-23-94 Technician C. Haljeson

0	Test <u>20</u> Run <u>0</u> Field Blank Log Number <u>2971-39F</u> Comments _____	Filter No. <u>6633</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.9439</u> g Filter+Sample Wt. <u>.9447</u> g Sample Wt. <u>0.0003</u> g
1	Test <u>20</u> Run <u>1</u> Log Number <u>-40F</u> Comments _____	Filter No. <u>6414</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.9414</u> g Filter+Sample Wt. <u>.9464</u> g Sample Wt. <u>.0050</u> g
2	Test <u>20</u> Run <u>2</u> Log Number <u>-41F</u> Comments _____	Filter No. <u>6539</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.9401</u> g Filter+Sample Wt. <u>.9404</u> g Sample Wt. <u>0.0003</u> g
3	Test <u>20</u> Run <u>3</u> Log Number <u>-42F</u> Comments _____	Filter No. <u>6541</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.9327</u> g Filter+Sample Wt. <u>.9369</u> g Sample Wt. <u>0.0042</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0050	0.0003	0.0042		

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0179	0.0072	0.0086		

LSC-02PR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job Cyprus N.S. Source #2 Fine Crusher
Team Leader RR Test Site Stack
Date Submitted 5-31-94 Date of Test 5-25-94
Test No. 20 No. of Runs Completed 3
Date of Analysis 6-29-94 Technician C. Helgeson

0	Test <u>20</u> Run <u>0</u> Field Blank Log Number <u>2171- 39 I</u> Comments _____	Dish No. <u>507 A</u> Dish Tare Wt. <u>50.0162</u> g Dish+Sample Wt. <u>50.0165</u> g Sample Wt. <u>0.0003</u> g
1	Test <u>20</u> Run <u>1</u> Log Number <u>2971- 40 I</u> Comments _____	Dish No. <u>508</u> Dish Tare Wt. <u>46.5064</u> g Dish+Sample Wt. <u>46.5091</u> g Sample Wt. <u>0.0027</u> g
2	Test <u>20</u> Run <u>2</u> Log Number <u>-41 I</u> Comments _____	Dish No. <u>512</u> Dish Tare Wt. <u>49.3589</u> g Dish+Sample Wt. <u>49.3616</u> g Sample Wt. <u>0.0027</u> g
3	Test <u>20</u> Run <u>3</u> Log Number <u>-42 I</u> Comments _____	Dish No. <u>612</u> Dish Tare Wt. <u>49.6288</u> g Dish+Sample Wt. <u>49.6302</u> g Sample Wt. <u>0.0014</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

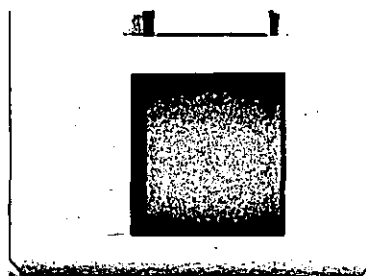
Blank Solvent Wt. _____ g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0024	0.0024	0.0011	D-39	

LSC-03.GF



Interpoll Laboratories
(512) 784-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Cyprus N.S. Source Bin Storage
Team Leader SB Test Site Stack
Date Submitted 5-31-94 Date of Test 5-25-94
Test No. 21 No. of Runs Completed 3
Date of Analysis 6-27-94 Technician C. Helgeson
Transport Leakage ☒ None ☐ ml Solvent Acetone

3	Test <u> </u> Run <u>0</u> Field Blank Log Number <u> </u> Vol. of Solvent <u> </u> ml *Solvent Residue <u>3.64</u> ug/ml	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u> </u> g
1	Test <u>21</u> Run <u>1</u> Vol. of Solvent <u>70</u> ml Log Number <u>2971-43 P</u> Comments <u> </u>	Dish No. <u>40</u> Dish Tare Wt. <u>47.6445</u> g Dish+Sample Wt. <u>47.6539</u> g Sample Wt. <u>0.0094</u> g
2	Test <u>21</u> Run <u>2</u> Vol. of Solvent <u>60</u> ml Log Number <u>-44 P</u> Comments <u> </u>	Dish No. <u>43</u> Dish Tare Wt. <u>47.3891</u> g Dish+Sample Wt. <u>47.3927</u> g Sample Wt. <u>0.0036</u> g
3	Test <u>21</u> Run <u>3</u> Vol. of Solvent <u>50</u> ml Log Number <u>-45 P</u> Comments <u> </u>	Dish No. <u>55</u> Dish Tare Wt. <u>47.7790</u> g Dish+Sample Wt. <u>47.7883</u> g Sample Wt. <u>0.0093</u> g
4	Test <u> </u> Run <u> </u> Vol. of Solvent <u> </u> ml Log Number <u> </u> Comments <u> </u>	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u> </u> g
5	Test <u> </u> Run <u> </u> Vol. of Solvent <u> </u> ml Log Number <u> </u> Comments <u> </u>	Dish No. <u> </u> Dish Tare Wt. <u> </u> g Dish+Sample Wt. <u> </u> g Sample Wt. <u> </u> g

*Solvent Residue ug/ml = [(Sample Wt. g) (100)] / Vol. of Sol. ml

EPA-M5 Acetone Residue Blank Spec. (7.3 ug/ml)

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0091	0.0034	0.0091	D-43	

LSC-01YR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Cyprus N.S Source Bin Storage
Team Leader SB Test Site Stack
Date Submitted 5-31-94 Date of Test 5-25-94
Test No. 21 No. of Runs Completed 3
Date of Analysis 6-23-94 Technician C. Helgeson

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>21 Run 1</u> Log Number <u>2971-43F</u> Comments _____	Filter No. <u>6641</u> Filter Type <u>4"GF</u> Filter Tare Wt. <u>.9345</u> g Filter+Sample Wt. <u>.9353</u> g Sample Wt. <u>0.0008</u> g
2	Test <u>21 Run 2</u> Log Number <u>-44F</u> Comments _____	Filter No. <u>6639</u> Filter Type <u>4"GF</u> Filter Tare Wt. <u>.9390</u> g Filter+Sample Wt. <u>.9414</u> g Sample Wt. <u>0.0024</u> g
3	Test <u>21 Run 3</u> Log Number <u>-45F</u> Comments _____	Filter No. <u>6642</u> Filter Type <u>4"GF</u> Filter Tare Wt. <u>.9340</u> g Filter+Sample Wt. <u>.9364</u> g Sample Wt. <u>0.0024</u> g
4	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test <u>Run</u> Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0008	0.0024	0.0024		

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0122	0.0088	0.0133		

LSC-02PR

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job <u>Cyprus N.S.</u>	Source <u>Bin Storage</u>
Team Leader <u>SB</u>	Test Site <u>Stack</u>
Date Submitted <u>5-31-94</u>	Date of Test <u>5-25-94</u>
Test No. <u>21</u>	No. of Runs Completed <u>3</u>
Date of Analysis <u>6-21-94</u>	Technician <u>C. Helgeson</u>

0	Test <u>Run 0</u> Field Blank Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
1	Test <u>21</u> Run <u>1</u> Log Number <u>2971-43F</u> Comments _____	Dish No. <u>3</u> Dish Tare Wt. <u>52.1216</u> g Dish+Sample Wt. <u>52.1242</u> g Sample Wt. <u>0.0026</u> g
2	Test <u>21</u> Run <u>2</u> Log Number <u>-44T</u> Comments _____	Dish No. <u>8</u> Dish Tare Wt. <u>46.9759</u> g Dish+Sample Wt. <u>46.9792</u> g Sample Wt. <u>0.0033</u> g
3	Test <u>21</u> Run <u>3</u> Log Number <u>-45T</u> Comments _____	Dish No. <u>19</u> Dish Tare Wt. <u>47.9752</u> g Dish+Sample Wt. <u>47.9773</u> g Sample Wt. <u>0.0021</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

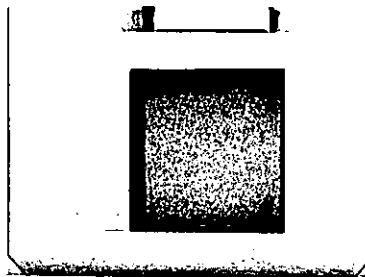
Blank Solvent Wt. 0.003 g

Results:

Field Blk.	Run 1	Run 2	Run 3	Run 4	Run 5

	0.0023	0.0030	0.0018	D-42	

LSC-03.GR



Interpoll Laboratories
(312) 785-6020

EPA Method 5 Data Reporting Sheet
Probe/Cyclone Wash

Job Cyprus N.S. Source #2 Boiler
Team Leader DUH Test Site Stack
Date Submitted 5-31-94 Date of Test 5-27-94
Test No. 23 No. of Runs Completed 3
Date of Analysis 6-27-94 Technician C. Helgeson
Transport Leakage ☒ None ☐ _____ ml Solvent Acetone

0	Test <u>23</u> Run <u>0</u> Field Blank Log Number <u>2971-46P</u> Vol. of Solvent <u>110</u> ml *Solvent Residue <u>3.64</u> ug/ml	Dish No. <u>64</u> Dish Tare Wt. <u>43.1480</u> g Dish+Sample Wt. <u>43.1487</u> g Sample Wt. <u>0.0004</u> g
1	Test <u>23</u> Run <u>1</u> Vol. of Solvent <u>100</u> ml Log Number <u>-47P</u> Comments _____	Dish No. <u>80</u> Dish Tare Wt. <u>49.6273</u> g Dish+Sample Wt. <u>49.6750</u> g Sample Wt. <u>0.0477</u> g
2	Test <u>23</u> Run <u>2</u> Vol. of Solvent <u>100</u> ml Log Number <u>-48P</u> Comments _____	Dish No. <u>84</u> Dish Tare Wt. <u>49.1013</u> g Dish+Sample Wt. <u>49.1221</u> g Sample Wt. <u>0.0208</u> g
3	Test <u>23</u> Run <u>3</u> Vol. of Solvent <u>90</u> ml Log Number <u>-49P</u> Comments _____	Dish No. <u>98</u> Dish Tare Wt. <u>47.2161</u> g Dish+Sample Wt. <u>47.2555</u> g Sample Wt. <u>0.0394</u> g
4	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Vol. of Solvent _____ ml Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

*Solvent Residue 3.64 ug/ml = [(Sample Wt. 0.0004 g) (10⁶)] / Vol. of Sol. 110 ml

EPA-MS Acetone Residue Blank Spec. { 7.3 ug/ml

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	<u>0.0473</u>	<u>0.0204</u>	<u>0.0391</u>	<u>D-46</u>	

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Filter Gravimetrics

Job Cyprus N.S. Source #2 Boiler
Team Leader DUH Test Site Stack
Date Submitted 5-31-94 Date of Test 5-27-94
Test No. 23 No. of Runs Completed 3
Date of Analysis 6-23-94 Technician C. Helgeson

0	Test <u>23</u> Run <u>0</u> Field Blank Log Number <u>2971-46F</u> Comments _____	Filter No. <u>6634</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.9497</u> g Filter+Sample Wt. <u>.9500</u> g Sample Wt. <u>0.0003</u> g
1	Test <u>23</u> Run <u>1</u> Log Number <u>-47F</u> Comments _____	Filter No. <u>6542</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.9306</u> g Filter+Sample Wt. <u>.9401</u> g Sample Wt. <u>0.0095</u> g
2	Test <u>23</u> Run <u>2</u> Log Number <u>-48F</u> Comments _____	Filter No. <u>6631</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.9296</u> g Filter+Sample Wt. <u>.9392</u> g Sample Wt. <u>0.0096</u> g
3	Test <u>23</u> Run <u>3</u> Log Number <u>-49F</u> Comments _____	Filter No. <u>6535</u> Filter Type <u>4"6F</u> Filter Tare Wt. <u>.9498</u> g Filter+Sample Wt. <u>.9706</u> g Sample Wt. <u>0.0208</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Filter No. _____ Filter Type _____ Filter Tare Wt. _____ g Filter+Sample Wt. _____ g Sample Wt. _____ g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0095	0.0096	0.0208		

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0590	0.0337	0.0617		

LSC-02PR

INTERPOLL LABORATORIES, INC.

(612) 786-6020

Sample Chain of Custody

Job Cypress / North Shore, no source Date of Test 5-24-94 Site Inter Log No. 2971
 Field Engineer M. Kachler Test No. 1 No. of Runs 3

No. Items	Sample Type	Analysis	Sequence No.	Comments
3 + 1	Probe Wash: ☒ Acetone ☐ MeCl ₃	☐ EPA M-5 ☐ EPA M-29		
3 + 1	Filter: ☐ 4" Glass ☒ 2.5" Glass	☐ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A		
-	Impingers: ☐ DI Water ☐ 3% H ₂ O ₂ ☐ 1N NaOH ☐ 2,4-DNPH	☐ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A		
2	Integrated Gas: ☒ Tedlar Bag	☐ EPA M-3 ☐ EPA M-10		Truck
-	Oxides of Nitrogen:	☐ EPA M-7A		
-	Fuel Lab: ☐ Fuel Sample	☐ Per S-0163		
-	Particle Sizing:	☐ X-Ray Scatgraph ☐ Cascade Imp		
-	Miscellaneous:	☐		

Fuel Type: Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
 Wood: ☐ Wood Waste ☐ Dust ☐ Bark
 Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
 Misc: ☒ Natural Gas ☐ RDF ☐

Relinquished by/Affiliation	Accepted by/Affiliation	Date
Mark Gachler / Interpoll Labs	CEL	0945 5/24/94

Interpoll Laboratories
(612) 786-6020

EPA Method 5 Data Reporting Sheet
Impinger Catch/Minnesota Protocol

Job Cyems N.S. Source #2 Boiler
Team Leader DUH Test Site Stack
Date Submitted 5-31-94 Date of Test 5-27-94
Test No. 23 No. of Runs Completed 3
Date of Analysis 6-29-94 Technician C. Helgeson

0	Test <u>23</u> Run <u>0</u> Field Blank Log Number <u>2971-46I</u> Comments _____	Dish No. <u>9</u> Dish Tare Wt. <u>48.2774</u> g Dish+Sample Wt. <u>48.2777</u> g Sample Wt. <u>0.0003</u> g
1	Test <u>23</u> Run <u>1</u> Log Number <u>2971-47I</u> Comments _____	Dish No. <u>34</u> Dish Tare Wt. <u>47.2506</u> g Dish+Sample Wt. <u>47.2531</u> g Sample Wt. <u>0.0025</u> g
2	Test <u>23</u> Run <u>2</u> Log Number <u>~48I</u> Comments _____	Dish No. <u>41</u> Dish Tare Wt. <u>45.3220</u> g Dish+Sample Wt. <u>45.3260</u> g Sample Wt. <u>0.0040</u> g
3	Test <u>23</u> Run <u>3</u> Log Number <u>~49I</u> Comments _____	Dish No. <u>63</u> Dish Tare Wt. <u>50.4252</u> g Dish+Sample Wt. <u>50.4273</u> g Sample Wt. <u>0.0021</u> g
4	Test _____ Run _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g
5	Test _____ Run _____ Log Number _____ Comments _____	Dish No. _____ Dish Tare Wt. _____ g Dish+Sample Wt. _____ g Sample Wt. _____ g

Blank Solvent Wt. 0.0003 g

Results:

Field Blk. Run 1 Run 2 Run 3 Run 4 Run 5

	0.0022	0.0037	0.0018	D-45	

INTERPOL LABORATORIES, INC.

(612) 786-6020

Sample Chain of Custody

Job
Field Engineer

Source

Date of Test

Site

Log No.

No. of Runs

Test No.

2

Stack

2971

3

No. Items	Sample Type	Analysis	Sequence No.	Comments
1	Probe Wash: ☒ Acetone ☐ MeCl ₂	☒ DI Water ☐ MeCl ₂		
2	Filter: ☒ 4" Glass ☐ 55 Thimble	☒ Pallflex ☐ 2.5" Glass		
2	Impingers: ☒ H ₂ O ☐ HNO ₃ /H ₂ O ₂ ☐ 13% H ₂ O ₂ ☐ 1N NaOH ☐ 2,4-DNPH	☐ H ₂ SO ₄ ☐ HNO ₃ /H ₂ O ₂ ☐ KMnO ₄ /H ₂ SO ₄ ☐ Acid Gases		
3	Integrated Gas: ☒ Cellular Bag	☒ EPA M-3 ☐ EPA M-10		
	Oxides of Nitrogen:	☐ EPA M-7A ☐ EPA M-202 ☐ EPA M-26 ☐ Acid Gases		
	Fuel Lab: ☐ Fuel Sample	☐ Per S-0163		
	Particle Sizing:	☐ X-Ray Scatograph ☐ Cascade Imp		
	Miscellaneous:	☐		

Fuel Type: Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
 Wood: ☐ Wood Waste ☐ Dust ☐ Bark
 Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
 Misc: ☐ Natural Gas ☐ RDF ☐

Relinquished by/Affiliation	Accepted by/Affiliation	Date
<i>[Signature]</i>	<i>[Signature]</i>	5/31/94 09:15

INTERPOLL LABORATORIES, INC.

(612) 786-6020

Sample Chain of Custody

Log No. _____
No. of Runs _____

Job _____
Field Engineer CYPRUS Source Ab. 12 ROTOCORE Site Inter
RON ROSENTHAL Date of Test 5-24-94 Test No. 4

No. Items	Sample Type	Analysis	Sequence No.	Comments
3	Probe Wash: ☒ Acetone ☐ MeCl ₂	☒ EPA M-5 ☐ EPA M-29	☐ EPA M-201A	
3	Filters: ☐ 4" Glass ☒ 55 Thimble	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A	☐ EPA M-17	
—	Impingers: ☐ DI Water ☐ 3% H ₂ O ₂ ☐ 1N NaOH ☐ 2,4-DNPH	☐ JMN Protocol ☐ WI Protocol ☐ EPA M-202 ☐ EPA M-6,8 ☐ Acid Gases	☐ JIA Protocol ☐ Formaldehyde ☐ EPA M-29 ☐ EPA M-26	
—	Integrated Gas: ☒ Tedlar Bag	☐ EPA M-3	☐ EPA M-10	AMBIENT AIR
—	Oxides of Nitrogen:	☐ EPA M-7A		
—	Fuel Lab: ☐ Fuel Sample	☐ Per S-0163		
—	Particle Sizing:	☐ X-Ray Sdgraph	☐ Cascade Imp	
—	Miscellaneous:	☐		

Fuel Type: Coal: ☐ Bituminous
☐ Anthracite
☐ Lignite
Wood: ☐ Wood Waste
☐ Dust
☐ Bark
Oil: ☐ Waste Oil
☐ No. 2
☐ No. 6
Misc: ☐ Natural Gas
☐ RDF
☐

Relinquished by/Affiliation	Accepted by/Affiliation	Date
<u>Ron Rosenthal / Interpoll Labs</u>	<u>RC</u>	<u>5/31/94 0945</u>

INTERPOL LABORATORIES, INC.

(612) 786-6020

Sample Chain of Custody

Job Upper North Shore Source N. 12-2 Pelletizer Date of Test 5-24-94 Test No. 5 Log No. 2776 No. of Runs 3

No. Items	Sample Type	Analysis	Sequence No.	Comments
4	Probe Wash: ☒ Acetone ☐ MeCl, ☐ DI Water ☐ _____	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A		
4	Filter: ☒ 4" Glass ☐ SS Thimble	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A		
4	Impingers: ☒ DI Water ☐ 3% H ₂ O ₂ ☐ 1N NaOH ☐ 2,4-DNPH ☐ H ₂ SO ₄ ☐ HNO ₃ /H ₂ O ₂ ☐ KMnO ₄ /H ₂ SO ₄ ☐ _____	☒ MN Protocol ☐ WI Protocol ☐ EPA M-202 ☐ EPA M-6,8 ☐ Acid Gases ☐ I/A Protocol ☐ Formaldehyde ☐ EPA M-29 ☐ EPA M-26 ☐ _____		
0	Integrated Gas: ☒ Tedlar Bag ☐ _____	☒ EPA M-3 ☐ _____ ☐ EPA M-7A ☐ _____ ☐ Per S-0163		<u>Anticist Car</u>
0	Oxides of Nitrogen:			
0	Fuel Lab: ☐ Fuel Sample ☐ Aggregate			
0	Particle Sizing:	☐ X-Ray Sdgraph ☐ _____ ☐ Cascade Imp		
0	Miscellaneous: ☐ _____			

Fuel Type: Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite Wood: ☐ Wood Waste ☐ Dust ☐ Bark Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6 Misc: ☐ Natural Gas ☐ ORDE ☒ Anticist

Relinquished by/Affiliation	Accepted by/Affiliation	Date
<u>Scott Bridle / Interpoll</u>	<u>Scott / Interpoll</u>	<u>5/27/94 0830</u>

INTERPOLL LABORATORIES, INC.

(612) 786-6020

Sample Chain of Custody

Job Field Engineer Caprice Source 7/12/94 West Date of Test 5-24-94 Test No. 6 Log No. 297 No. of Runs 3

No. Items	Sample Type	Analysis	Sequence No.	Comments
3	Probe Wash: ☒ Acetone ☐ MeCl ₂	☒ EPA M-5 ☐ EPA M-29		
3	Filter: ☒ 4" Glass ☐ 55 Thimble	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A		
3	Impingers: ☒ DI Water ☐ 3% H ₂ O ₂ ☐ 1N NaOH ☐ 2,4-DNPH	☒ IIA Protocol ☐ WI Protocol ☐ EPA M-202 ☐ EPA M-26 ☐ Acid Gases		
3	Integrated Gas: ☒ Tedlar Bag	☒ EPA M-3		
	Oxides of Nitrogen:	☐ EPA M-7A		
	Fuel Lab: ☐ Fuel Sample	☐ Per S-0163		
	Particle Sizing:	☐ X-Ray Sdgraph ☐ Cascade Imp		
	Miscellaneous:	☐		

Fuel Type: Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
 Wood: ☐ Wood Waste ☐ Dust ☐ Bark
 Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
 Misc: ☐ Natural Gas ☐ RDF ☐

Relinquished by/Affiliation	Accepted by/Affiliation	Date
<u>Caprice</u>	<u>Caprice</u>	5/31/94 0945

INTERPOLL LABORATORIES, INC.

(612) 786-6020

Sample Chain of Custody

Log No. 2971

No. of Runs 3

Job Exposure

Field Engineer Mr. Kowalski

Source Asbestos

Date of Test 5-24-94

Site Int'l

Test No. 7 (2971)

No. Items	Sample Type	Analysis	Sequence No.	Comments
3	Probe Wash: ☒ Acetone ☐ MeCl ₂	☐ DI Water ☐ _____		
3	Filter: ☐ 4" Glass ☒ 2.5" Glass	☐ Pallflex ☐ 2.5" Glass		
—	Impingers: ☐ DI Water ☐ 3% H ₂ O ₂ ☐ 1N NaOH ☐ 2,4-DNPH	☐ H ₂ SO ₄ ☐ HNO ₃ /H ₂ O ₂ ☐ KMnO ₄ /H ₂ SO ₄ ☐ _____		
—	Integrated Gas: ☐ Tedlar Bag	☐ _____		
—	Oxides of Nitrogen:			
—	Fuel Lab: ☐ Fuel Sample	☐ Aggregate		
—	Particle Sizing:			
—	Miscellaneous:	☐ _____		

Fuel Type: Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
 Wood: ☐ Wood Waste ☐ Dust ☐ Bark
 Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
 Misc: ☒ Natural Gas ☐ RDF ☐ _____

Relinquished by/Affiliation	Accepted by/Affiliation	Date
<u>Mark Bachler Interpoll Labs</u>	<u>Carl Interpoll</u>	<u>5/24/94 0945</u>

INTERPOLL LABORATORIES, INC.

(612) 786-6020

Sample Chain of Custody

Job Field Engineer Cypri/Silver Bay, Source Date of Test 5-25-94 Test No. 8 Log No. 2971 No. of Runs 3

No. Items	Sample Type	Analysis	Sequence No.	Comments
3 + 1	Probe Wash: ☐ Acetone ☒ MeCl ₂	☐ DI Water ☐ _____		
3 + 1	Filters: ☐ 4" Glass ☒ PSS Thimble	☐ Pallflex ☐ 2.5" Glass		
3 + 2	Impingers: ☐ DI Water ☐ 3% H ₂ O ₂ ☐ 1N NaOH ☐ 2,4-DNPH	☐ H ₂ SO ₄ ☐ HNO ₃ /H ₂ O ₂ ☒ KMnO ₄ /H ₂ SO ₄ ☐ _____		
-	Integrated Gas: ☐ Tedlar Bag	☐ _____		Trailer
-	Oxides of Nitrogen:	☐ EPA M-7A ☐ _____		Trailer
-	Fuel Lab: ☐ Fuel Sample	☐ Per S-0163		
-	Particle Sizing:	☐ X-Ray Scigraph ☐ Cascade Imp		
-	Miscellaneous:	☐ _____		

Fuel Type: Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
 Wood: ☐ Wood Waste ☐ Dust ☐ Bark
 Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
 Misc: ☒ Natural Gas ☐ RDF ☐ _____

Relinquished by/Affiliation	Accepted by/Affiliation	Date
Mark Gabeler / Interpoll Labs		5/31/94 0945

INTERPOLL LABORATORIES, INC.

(612) 786-6020

Sample Chain of Custody

Job Field Engineer Mr. Kaehler Date of Test 5-25-94 Site Inter Log No. 2971
Cypress/Silver-Bay, Source Test No. 7 No. of Runs 3

No. Items	Sample Type	Analysis	Sequence No.	Comments
3	Probe Wash: ☒ Acetone ☐ MeCl ₂	☐ EPA M-5 ☐ EPA M-29		
3	Filler: ☐ 4" Glass ☒ SS Thimble	☐ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A		
—	Impingers: ☐ DI Water ☐ 3% H ₂ O ₂ ☐ 1N NaOH ☐ 2,4-DNPH	☐ I/A Protocol ☐ IWI Protocol ☐ EPA M-202 ☐ EPA M-6,8 ☐ Acid Gases		
—	Integrated Gas: ☐ Tedlar Bag	☐ EPA M-3 ☐ EPA M-10		Trailer
—	Oxides of Nitrogen:	☐ EPA M-7A ☐ EPA M-10		Trailer
—	Fuel Lab: ☐ Fuel Sample ☐ Aggregate	☐ Per S-0163		
—	Particle Sizing:	☐ X-Ray Scdgraph ☐ Cascade Imp		
—	Miscellaneous:	☐ _____		

Fuel Type: Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
 Wood: ☐ Wood Waste ☐ Dust ☐ Bark
 Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
 Misc: ☒ Natural Gas ☐ RDF ☐ _____

Relinquished by/Affiliation	Accepted by/Affiliation	Date
<u>Mark Kaehler / Interpoll Labs</u>	<u>[Signature]</u>	<u>5/31/94 0945</u>

INTERPOLL LABORATORIES, INC.

(612) 786-6020

Sample Chain of Custody

Source

Cyprus
5-25-95

Site

Starch
10

Log No.

2971

No. of Runs

5

Job
Field Engineer

Date of Test

Test No.

5-25-95
10

No. Items	Sample Type	Analysis	Sequence No.	Comments
<i>3</i>	Probe Wash: ☒ Acetone ☐ MeCl ₂	☒ EPA M-5 ☐ EPA M-29		
<i>3</i>	Filter: ☒ 4" Glass ☐ SS Thimble	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A		
<i>3</i>	Impingers: ☒ H ₂ O ☐ 3% H ₂ O ₂ ☐ 1N NaOH ☐ 2,4-DNPH	☒ MIN Protocol ☐ IWI Protocol ☐ EPA M-202 ☐ EPA M-6,8 ☐ Acid Gases		
<i>18</i>	Integrated Gas: ☒ Tedlar Bag	☒ EPA M-3 ☐ EPA M-7A		<i>USE CIM'S 02-CUZ</i>
	Oxides of Nitrogen:			
	Fuel Lab: ☐ Fuel Sample ☐ Aggregate	☐ Per S-0163		
	Particle Sizing:	☐ X-Ray Sdgraph ☐ Cascade Imp		
	Miscellaneous:			

Misc: ☐ Natural Gas
☐ RDF
☐

Oil: ☐ Waste Oil
☐ No. 2
☐ No. 6

Wood: ☐ Wood Waste
☐ Dust
☐ Bark

Fuel Type: Coal: ☐ Bituminous
☐ Anthracite
☐ Lignite

Relinquished by/Affiliation	Accepted by/Affiliation	Date
<i>E. J. [Signature]</i>	<i>[Signature]</i>	<i>5/31/94 0945</i>

(612) 786-6020

Sample Chain of Custody:

4/20/2020
4/20/2020
4/20/2020

Source

Source *NA*
Date of Test

elis

23/2

Log No.

Log No.
No. of Runs

291

27/3

No. Items	Sample Type	Analysis	Sequence No.	Comments
3	Probe Wash: ☒ Acetone ☐ MeCl ₂	☒ EPA M-5 ☐ EPA M-29		
3	Filters: ☒ 2.5" Glass ☐ SS Thimble	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A		
3	Impingers: ☒ DI Water ☐ 3% H ₂ O ₂ ☐ 1N NaOH ☐ 2,4-DNPH	☒ IIA Protocol ☐ IWI Protocol ☐ EPA M-202 ☐ EPA M-6,8 ☐ Acid Gases		
	Integrated Gas: ☒ Tedlar Bag	☒ EPA M-3 ☐ EPA M-10		<u>ALL GEMS ANALYZED</u>
	Oxides of Nitrogen:	☐ EPA M-7A ☐ Per 5-0163		
	Fuel Lab: ☐ Fuel Sample	☐ X-Ray Sidgraph ☐ Cascade Imp		
	Particle Sizing:			
	Miscellaneous:			

Relinquished by/Affiliation	Accepted by/Affiliation	Date
<i>[Signature]</i>	<i>[Signature]</i>	5/31/94

INTERPOLL LABORATORIES, INC.

(612) 786-6020

Sample Chain of Custody

Job Field Engineer Gregory S. Lucchesi Source 66104 Keller Site Stack Log No. 2171
Wilkes-Barre Date of Test 5-25-94 Test No. 15 No. of Runs 3

No. Items	Sample Type	Analysis	Sequence No.	Comments
3 + 1	Probe Wash: ☒ DI Water ☐ Acetone ☐ MeCl ₂	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A		
3 + 1	Filters: ☒ 2 1/2" Glass ☐ 55 Thimble	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A		
3 + 1	Impingers: ☒ DI Water ☐ 3% H ₂ O ₂ ☐ 1N NaOH ☐ 2,4-DNPH	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A ☐ EPA M-17		
-	Integrated Gas: ☐ Tedlar Bag	☐ EPA M-3 ☐ EPA M-10		<u>Trickle</u>
-	Oxides of Nitrogen:	☐ EPA M-7A ☐ EPA M-10		<u>Trickle</u>
-	Fuel Lab: ☐ Fuel Sample	☐ Per S-0163		
-	Particle Sizing:	☐ X-Ray Scdgraph ☐ Cascade Imp		
-	Miscellaneous:	☐		

Fuel Type: Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
 Wood: ☐ Wood Waste ☐ Dust ☐ Bark
 Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
 Misc: ☒ Natural Gas ☐ RDF ☐

Relinquished by/Affiliation	Accepted by/Affiliation	Date
<u>William J. Lucchesi / Interpoll Labs</u>	<u>GL</u>	<u>5/31/94 0945</u>

Interpoll Laboratories

(612) 786-6020

SAMPLE CHAIN OF CUSTODY

Job Cyprus

Field Engineer Dust

Source No 105 Pelletizer

Date of Test 5/26/94

Test No. 18

No. of Runs 3

Site Stack

# ITEMS	SAMPLE TYPE	ANALYSIS	LOG NUMBER	COMMENTS
4	Probe Wash: ☒ Acetone ☐ MeCl ₂	☒ EPA M-5 ☐ EPA M-29		
4	Filter: ☒ 4" Glass ☐ SS Thimble	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A		
4	Impingers: ☒ DI Water ☐ 3% H ₂ O ₂ ☐ 1N NaOH ☐ 2,4-DNPH	☒ MIN Protocol ☐ IIA Protocol ☐ Formaldehyde ☐ EPA M-29 ☐ EPA M-20 ☐ Acid Gases		
	Integrated Gas: ☐ Tedlar Bag	☐ EPA M-3 ☐ EPA M-10		
	Oxides of Nitrogen:	☐ EPA M-7A		
	Fuel Lab: ☐ Fuel Sample	☐ Per S-0163		
	Particle Sizing:	☐ X-Ray Sdgraph ☐ Cascade Imp		
	Miscellaneous:			

Fuel Type: Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
 Wood: ☐ Wood Waste ☐ Oil: ☐ Waste Oil
 Dust: ☐ Dust ☐ Bark

Misc: ☐ Natural Gas ☐ RDF ☐

Relinquished by/Affiliation

Accepted by/Affiliation

Date

Diane Van Hoey 5/31/94

INTERPOL LABORATORIES, INC.

(612) 786-6020

Sample Chain of Custody

Job Cyprian Source AD. FINE Chemical Site Log No. 3
 Field Engineer Rob Rosenthal Date of Test 5-25-94 Test No. 20 No. of Runs

No. Items	Sample Type	Analysis	Sequence No.	Comments
4	Probe Wash: ☒ Acetone ☐ MeCl ₂	☐ DI Water ☐ _____	☐ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A	☐ EPA M-201A ☐ _____
4	Filter: ☒ 4" Glass ☐ SS Thinble	☐ Pallflex ☐ 2.5" Glass	☐ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A	☐ EPA M-17 ☐ _____
4	Impingers: ☒ DI Water ☐ 3% H ₂ O ₂ ☐ 1N NaOH ☐ 2,4-DNPH	☐ H ₂ SO ₄ ☐ HNO ₃ /H ₂ O ₂ ☐ KMnO ₄ /H ₂ SO ₄ ☐ _____	☐ MN Protocol ☐ DWI Protocol ☐ EPA M-202 ☐ EPA M-6,8 ☐ Acid Gases ☐ _____	☐ IIA Protocol ☐ Formaldehyde ☐ EPA M-29 ☐ EPA M-26 ☐ _____
—	Integrated Gas: ☐ Tedlar Bag	☐ _____	☐ EPA M-3 ☐ _____	☐ EPA M-10 ☐ _____
—	Oxides of Nitrogen:		☐ EPA M-7A ☐ _____	☐ _____
—	Fuel Lab: ☐ Fuel Sample	☐ Aggregate	☐ Per S-0163	☐ _____
—	Particle Sizing:		☐ X-Ray Sdgraph ☐ _____	☐ Cascade Imp ☐ _____
—	Miscellaneous:	☐ _____	☐ _____	☐ _____

Fuel Type: Coal: ☐ Bituminous ☐ Wood Waste ☐ Oil: ☐ Waste Oil ☐ Natural Gas
☐ Anthracite ☐ Dust ☐ No. 2 ☐ RDF
☐ Lignite ☐ No. 6 ☐ _____

Relinquished by/Affiliation	Accepted by/Affiliation	Date
<u>Rob Rosenthal / INTERPOL Labs</u>	<u>CEL</u>	<u>5/31/94 0945</u>

INTERPOLL LABORATORIES, INC.

(612) 786-6020

Sample Chain of Custody

Job Exposure North Shore Source Exposure North Shore Date of Test 5-25-94 Test No. 21 Log No. 2976
 Field Engineer 53 No. of Runs 3

No. Items	Sample Type	Analysis	Sequence No.	Comments
3	Probe Wash: ☒ Acetone ☐ MeCl ₂	☒ EPA M-5 ☐ EPA M-29	☐ EPA M-201A ☐ _____	
3	Filter: ☒ 4" Glass ☐ SS Thimble	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A	☐ EPA M-17	
3	Impingers: ☒ DI Water ☐ 3% H ₂ O ₂ ☐ 1N NaOH ☐ 2,4-DNPH	☒ MN Protocol ☐ WI Protocol ☐ EPA M-202 ☐ EPA M-6,8 ☐ Acid Gases	☐ IA Protocol ☐ Formaldehyde ☐ EPA M-29 ☐ EPA M-26 ☐ _____	
0	Integrated Gas: ☐ Tedlar Bag	☐ EPA M-3 ☐ _____	☐ EPA M-10	<i>Substantive</i>
0	Oxides of Nitrogen:	☐ EPA M-7A ☐ _____		
0	Fuel Lab: ☐ Fuel Sample ☐ Aggregate	☐ Per S-0163		
0	Particle Sizing:	☐ X-Ray Sdgraph ☐ _____	☐ Cascade Imp	
0	Miscellaneous: ☐ _____	☐ _____		

Fuel Type: Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
 Wood: ☐ Wood Waste ☐ Dust ☐ Bark
 Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
 Misc: ☐ Natural Gas ☐ RDF ☒ *Substantive*

Relinquished by/Affiliation	Accepted by/Affiliation	Date
<i>Joe M. D. Smith / Interpoll Labs Inc.</i>	<i>Scott / Interpoll</i>	<i>5/27/94 / 0830</i>

INTERPOL LABORATORIES, INC.

(612) 786-6020

Sample Chain of Custody

Job Cyprus Source No 2 Boiler Site Stack Log No. 2871
 Field Engineer DW Date of Test 5/27/94 Test No. 23 No. of Runs 3

No. Items	Sample Type	Analysis	Sequence No.	Comments
4	Probe Wash: ☒ Acetone ☐ MeCl ₄	☒ EPA M-5 ☐ EPA M-29		
4	Filters: ☒ 4" Glass ☐ SS Thimble	☒ EPA M-5 ☐ EPA M-29 ☐ EPA M-201A		
4	Impingers: ☒ DI Water ☐ H ₂ SO ₄ ☐ HNO ₃ /H ₂ O ₂ ☐ 3% H ₂ O ₂ ☐ 1N NaOH ☐ KMnO ₄ /H ₂ SO ₄ ☐ 2,4-DNPH	☒ MIN Protocol ☐ WI Protocol ☐ EPA M-202 ☐ EPA M-6,8 ☐ Acid Gases		
	Integrated Gas: ☐ Tedlar Bag	☐ EPA M-3 ☐ EPA M-10		
	Oxides of Nitrogen:	☐ EPA M-7A ☐		
	Fuel Lab: ☐ Fuel Sample ☐ Aggregate	☐ Per S-0163		
	Particle Sizing:	☐ X-Ray Sdgraph ☐ Cascade Imp		
	Miscellaneous:	☐		

Fuel Type: Coal: ☐ Bituminous ☐ Anthracite ☐ Lignite
 Wood: ☐ Wood Waste ☐ Dust ☐ Bark
 Oil: ☐ Waste Oil ☐ No. 2 ☐ No. 6
 Misc: ☐ Natural Gas ☐ RDF ☐

Relinquished by/Affiliation	Accepted by/Affiliation	Date
<u>David Van Hower</u>	<u>[Signature]</u>	<u>5/31/94 0945</u>

APPENDIX E

SULFUR DIOXIDE & OXIDES OF NITROGEN COMPUTER DATALOGGER PRINTOUTS

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM11
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

TEST NO. 1 - Electrics ON
No. 12 Pelletizer Hood Exhaust Inlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	09:53:00	3.4	0.7	0.08	20.58
144	09:54:00	3.5	0.7	0.08	20.58
144	09:55:00	3.5	0.7	0.08	20.58
144	09:56:00	3.6	0.7	0.08	20.58
144	09:57:00	3.5	0.7	0.08	20.58
144	09:58:00	3.6	0.8	0.08	20.58
144	09:59:00	3.6	0.8	0.08	20.58
144	10:00:00	3.6	0.7	0.08	20.58
144	10:01:00	3.6	0.7	0.07	20.58
144	10:02:00	3.6	0.7	0.07	20.58
144	10:03:00	3.6	0.7	0.07	20.58
144	10:04:00	3.6	0.8	0.07	20.58
144	10:05:00	3.7	0.8	0.07	20.58
144	10:06:00	3.8	0.8	0.07	20.58
144	10:07:00	3.7	0.8	0.07	20.58
144	10:08:00	3.8	0.8	0.07	20.58
144	10:09:00	3.8	0.8	0.06	20.58
144	10:10:00	3.7	0.8	0.06	20.58
144	10:11:00	3.7	0.8	0.06	20.58
144	10:12:00	3.7	0.8	0.07	20.58
144	10:13:00	3.7	0.8	0.07	20.58
144	10:14:00	3.6	0.8	0.07	20.58
144	10:15:00	3.7	0.8	0.06	20.59
144	10:16:00	3.7	0.9	0.06	20.59
144	10:17:00	3.6	0.8	0.06	20.58
144	10:18:00	3.6	0.9	0.06	20.59
144	10:19:00	3.5	0.9	0.06	20.59
144	10:20:00	3.5	0.9	0.06	20.59
144	10:21:00	3.6	0.9	0.06	20.59
144	10:22:00	3.6	0.9	0.06	20.59
144	10:23:00	3.7	0.9	0.06	20.59
144	10:24:00	3.6	0.9	0.06	20.59
144	10:25:00	3.6	0.9	0.06	20.59
144	10:26:00	3.4	1.0	0.06	20.59

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM11
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 1 - Electrics ON

No. 12 Pelletizer Hood Exhaust Inlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	10:27:00	3.4	0.9	0.06	20.59
144	10:28:00	3.5	1.0	0.06	20.59
144	10:29:00	3.4	1.0	0.06	20.59
144	10:30:00	3.5	0.9	0.06	20.59
144	10:31:00	3.4	1.0	0.07	20.58
144	10:32:00	3.3	1.0	0.07	20.58
144	10:33:00	3.3	1.0	0.06	20.58
144	10:34:00	3.4	1.0	0.06	20.58
144	10:35:00	3.4	1.0	0.06	20.58
144	10:36:00	3.4	1.0	0.06	20.58
144	10:37:00	3.3	1.0	0.06	20.58
144	10:38:00	3.3	1.1	0.07	20.58
144	10:39:00	3.2	1.0	0.06	20.58
144	10:40:00	3.3	1.1	0.07	20.58
144	10:41:00	3.3	1.1	0.08	20.58
144	10:42:00	3.4	1.1	0.08	20.58
144	10:43:00	3.4	1.1	0.08	20.58
144	10:44:00	3.2	1.1	0.08	20.58
144	10:45:00	3.5	1.1	0.08	20.58
144	10:46:00	3.4	1.1	0.08	20.58
144	10:47:00	3.5	1.2	0.08	20.58
144	10:48:00	3.5	1.1	0.08	20.57
144	10:49:00	3.5	1.1	0.09	20.58
144	10:50:00	3.5	1.1	0.08	20.58
144	10:51:00	3.4	1.1	0.08	20.58
Run Average		3.5	0.9	0.07	20.58

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM12
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 1 - Electrics ON

No. 12 Pelletizer Hood Exhaust Inlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	11:48:00	11.6	13.0	0.18	20.10
144	11:49:00	11.5	13.3	0.18	20.10
144	11:50:00	11.7	13.5	0.17	20.10
144	11:51:00	12.8	13.8	0.17	20.10
144	11:52:00	12.2	14.3	0.17	20.08
144	11:53:00	11.6	14.7	0.18	20.05
144	11:54:00	12.0	14.7	0.18	20.04
144	11:55:00	12.2	14.7	0.18	20.04
144	11:56:00	13.0	15.2	0.18	20.03
144	11:57:00	13.8	14.5	0.17	20.04
144	11:58:00	12.6	14.4	0.16	20.05
144	11:59:00	11.6	14.0	0.16	20.06
144	12:00:00	12.1	14.1	0.16	20.05
144	12:01:00	12.7	14.4	0.16	20.05
144	12:02:00	12.9	14.5	0.16	20.05
144	12:03:00	12.0	14.3	0.15	20.06
144	12:04:00	11.7	14.2	0.15	20.06
144	12:05:00	12.3	14.2	0.14	20.05
144	12:06:00	13.4	14.2	0.14	20.05
144	12:07:00	13.2	14.6	0.15	20.05
144	12:08:00	12.2	14.9	0.15	20.05
144	12:09:00	11.2	14.2	0.14	20.06
144	12:10:00	12.0	14.3	0.15	20.05
144	12:11:00	13.2	14.1	0.14	20.04
144	12:12:00	12.4	14.2	0.14	20.05
144	12:13:00	11.8	14.5	0.14	20.06
144	12:14:00	11.6	15.3	0.14	20.06
144	12:15:00	11.4	15.7	0.15	20.04
144	12:16:00	13.0	15.2	0.14	20.04
144	12:17:00	13.6	15.1	0.12	20.05
144	12:18:00	12.2	14.9	0.12	20.07
144	12:19:00	11.4	13.8	0.13	20.07
144	12:20:00	11.4	13.4	0.13	20.07
144	12:21:00	11.2	13.2	0.13	20.06

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM12
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 1 - Electrics ON

No. 12 Pelletizer Hood Exhaust Inlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	12:22:00	12.2	13.5	0.13	20.06
144	12:23:00	13.3	13.7	0.13	20.04
144	12:24:00	13.5	14.0	0.13	20.06
144	12:25:00	12.9	14.2	0.13	20.06
144	12:26:00	12.5	14.3	0.12	20.07
144	12:27:00	12.3	14.4	0.12	20.07
144	12:28:00	12.3	14.1	0.12	20.08
144	12:29:00	12.4	14.3	0.11	20.08
144	12:30:00	11.1	14.3	0.12	20.06
144	12:31:00	11.0	14.2	0.13	20.06
144	12:32:00	12.0	13.5	0.11	20.06
144	12:33:00	12.2	13.7	0.12	20.06
144	12:34:00	12.5	14.4	0.12	20.05
144	12:35:00	12.5	14.2	0.12	20.05
144	12:36:00	12.3	14.1	0.12	20.06
144	12:37:00	11.8	14.1	0.13	20.04
144	12:38:00	12.1	14.2	0.14	20.03
144	12:39:00	13.2	13.8	0.12	20.05
144	12:40:00	13.2	13.9	0.12	20.06
144	12:41:00	12.4	13.7	0.11	20.07
144	12:42:00	12.1	13.6	0.11	20.07
144	12:43:00	12.0	14.3	0.12	20.05
144	12:44:00	12.3	14.2	0.12	20.06
144	12:45:00	11.8	14.2	0.12	20.07
144	12:46:00	11.6	14.1	0.12	20.06
Run Average		12.2	14.2	0.14	20.06

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM13
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test NO. 1 - Electrics ON

No. 12 Pelletizer Hood Exhaust Inlet -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	13:28:00	11.8	14.6	0.36	20.09
144	13:29:00	12.0	14.9	0.35	20.08
144	13:30:00	11.3	14.9	0.35	20.07
144	13:31:00	12.5	14.6	0.35	20.07
144	13:32:00	13.8	14.7	0.34	20.07
144	13:33:00	12.6	14.7	0.34	20.07
144	13:34:00	12.1	15.0	0.35	20.06
144	13:35:00	12.2	14.8	0.34	20.05
144	13:36:00	12.0	14.7	0.35	20.03
144	13:37:00	12.2	14.6	0.35	20.03
144	13:38:00	13.6	15.4	0.35	20.01
144	13:39:00	13.9	15.2	0.34	20.03
144	13:40:00	13.4	15.2	0.34	20.03
144	13:41:00	12.4	15.0	0.34	20.05
144	13:42:00	11.8	14.2	0.33	20.05
144	13:43:00	11.7	13.8	0.33	20.05
144	13:44:00	12.3	13.9	0.33	20.04
144	13:45:00	12.3	13.9	0.33	20.04
144	13:46:00	12.0	13.6	0.33	20.04
144	13:47:00	13.2	13.2	0.32	20.06
144	13:48:00	14.0	13.3	0.31	20.09
144	13:49:00	13.3	13.8	0.31	20.10
144	13:50:00	11.9	13.6	0.30	20.11
144	13:51:00	10.9	13.4	0.30	20.12
144	13:52:00	10.4	14.0	0.31	20.11
144	14:18:00	10.8	15.1	0.32	20.05
144	14:19:00	10.8	14.8	0.32	20.04
144	14:20:00	11.5	14.8	0.32	20.03
144	14:21:00	12.9	14.7	0.32	20.04
144	14:22:00	12.8	14.8	0.32	20.05
144	14:23:00	11.4	14.1	0.32	20.04
144	14:24:00	11.3	13.8	0.31	20.05
144	14:25:00	11.2	13.9	0.31	20.05
144	14:26:00	11.3	14.4	0.32	20.04

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM13
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 1 - Electrics ON

No. 12 Pelletizer Hood Exhaust Inlet -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	14:27:00	12.5	14.5	0.31	20.05
144	14:28:00	12.0	14.2	0.31	20.06
144	14:29:00	11.1	14.2	0.32	20.05
144	14:30:00	11.0	14.1	0.32	20.04
144	14:31:00	11.6	13.9	0.32	20.04
144	14:32:00	11.6	14.3	0.32	20.05
144	14:33:00	10.8	14.7	0.33	20.03
144	14:34:00	10.8	14.7	0.33	20.02
144	14:35:00	12.1	14.3	0.32	20.04
144	14:36:00	13.5	14.1	0.31	20.05
144	14:37:00	12.6	14.2	0.31	20.07
144	14:38:00	11.6	14.7	0.31	20.08
144	14:39:00	10.6	14.1	0.30	20.09
144	14:40:00	10.8	14.0	0.30	20.10
144	14:41:00	11.9	14.1	0.30	20.08
144	14:42:00	10.9	14.1	0.31	20.07
144	14:43:00	11.0	14.1	0.31	20.06
144	14:44:00	12.0	14.0	0.31	20.06
144	14:45:00	11.9	14.7	0.32	20.05
144	14:46:00	12.8	15.1	0.32	20.04
144	14:47:00	13.5	15.2	0.32	20.05
144	14:48:00	12.5	15.2	0.32	20.06
144	14:49:00	11.9	15.4	0.33	20.05
144	14:50:00	11.2	14.8	0.32	20.05
144	14:51:00	11.3	13.8	0.32	20.05
144	14:52:00	12.1	13.5	0.31	20.06
Run Average		12.0	14.4	0.32	20.06

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM14
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 7 - Electrics OFF
No. 12 Pelletizer Hood Exhaust Inlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	15:23:00	13.8	15.8	0.15	20.01
144	15:24:00	15.3	15.5	0.14	20.02
144	15:25:00	14.7	15.2	0.13	20.04
144	15:26:00	12.8	14.6	0.13	20.05
144	15:27:00	12.9	14.0	0.12	20.07
144	15:28:00	13.9	14.3	0.12	20.07
144	15:29:00	13.3	14.2	0.12	20.06
144	15:30:00	13.1	13.7	0.10	20.07
144	15:31:00	12.9	13.3	0.09	20.08
144	15:32:00	13.1	13.3	0.08	20.08
144	15:33:00	12.4	13.7	0.09	20.07
144	15:34:00	12.9	13.7	0.09	20.06
144	15:35:00	13.7	13.6	0.09	20.06
144	15:36:00	14.3	13.8	0.08	20.05
144	15:37:00	13.8	14.6	0.09	20.06
144	15:38:00	12.6	15.2	0.10	20.03
144	15:39:00	13.0	15.3	0.10	20.02
144	15:40:00	13.8	15.2	0.09	20.03
144	15:41:00	14.2	15.4	0.10	20.03
144	15:42:00	14.3	15.9	0.10	20.02
144	15:43:00	13.5	15.2	0.10	20.02
144	15:44:00	12.2	14.8	0.10	20.01
144	15:45:00	12.9	14.8	0.10	19.99
144	15:46:00	14.7	14.7	0.09	20.00
144	15:47:00	15.8	14.6	0.09	20.02
144	15:48:00	14.9	14.8	0.09	20.04
144	15:49:00	14.3	14.7	0.09	20.03
144	15:50:00	13.5	14.5	0.09	20.03
144	15:51:00	13.2	14.3	0.08	20.03
144	15:52:00	13.8	14.7	0.09	20.03
144	15:53:00	14.1	15.2	0.09	20.01
144	15:54:00	14.0	14.6	0.08	20.03
144	15:55:00	13.6	14.7	0.09	20.02
144	15:56:00	14.5	14.4	0.09	20.02

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM14
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 7 - Electrics OFF

No. 12 Pelletizer Hood Exhaust Inlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	15:57:00	14.2	14.3	0.09	20.02
144	15:58:00	13.9	14.5	0.08	20.01
144	15:59:00	13.9	14.5	0.09	20.02
144	16:00:00	13.6	14.3	0.09	20.01
144	16:01:00	14.4	14.0	0.09	20.01
144	16:02:00	15.7	14.2	0.08	20.02
144	16:03:00	14.8	15.0	0.08	20.03
144	16:04:00	13.9	15.3	0.09	20.04
144	16:05:00	13.2	15.3	0.08	20.04
144	16:06:00	12.5	15.1	0.09	20.02
144	16:07:00	13.5	15.1	0.09	20.01
144	16:08:00	15.2	16.2	0.09	20.01
144	16:09:00	15.3	15.6	0.08	20.03
144	16:10:00	14.4	15.4	0.08	20.03
144	16:11:00	13.5	15.5	0.08	20.02
144	16:12:00	13.3	15.4	0.08	20.01
144	16:13:00	13.5	15.2	0.09	20.01
144	16:14:00	14.6	15.3	0.09	20.01
144	16:15:00	13.8	15.3	0.10	20.00
144	16:16:00	12.8	15.1	0.10	19.99
144	16:17:00	13.9	14.7	0.09	20.00
144	16:18:00	14.6	14.8	0.09	20.01
144	16:19:00	15.0	15.4	0.09	20.01
144	16:20:00	14.5	15.5	0.08	20.03
144	16:21:00	14.0	15.4	0.08	20.04
Run Average		13.8	14.8	0.09	20.03

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM15
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 7 - Electrics OFF
No. 12 Pelletizer Hood Exhaust Inlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	16:43:00	14.4	14.5	0.50	20.09
144	16:44:00	14.8	14.7	0.49	20.08
144	16:45:00	14.7	15.3	0.48	20.09
144	16:46:00	14.5	15.1	0.46	20.10
144	16:47:00	14.3	15.0	0.45	20.10
144	16:48:00	13.4	15.0	0.45	20.10
144	16:49:00	13.5	14.7	0.43	20.09
144	16:50:00	13.8	14.5	0.43	20.09
144	16:51:00	14.1	14.5	0.41	20.09
144	16:52:00	13.6	14.9	0.41	20.08
144	16:53:00	12.7	14.9	0.42	20.06
144	16:54:00	13.6	14.5	0.41	20.05
144	16:55:00	14.6	14.4	0.40	20.05
144	16:56:00	14.7	14.7	0.40	20.05
144	16:57:00	15.5	14.9	0.40	20.06
144	16:58:00	14.9	14.6	0.39	20.07
144	16:59:00	13.4	14.6	0.39	20.07
144	17:00:00	13.6	14.4	0.38	20.07
144	17:01:00	14.4	14.4	0.38	20.07
144	17:02:00	14.1	14.2	0.38	20.07
144	17:03:00	13.5	14.6	0.38	20.07
144	17:04:00	13.5	14.9	0.38	20.07
144	17:05:00	14.4	14.3	0.36	20.07
144	17:06:00	14.8	14.9	0.37	20.07
144	17:07:00	15.2	15.8	0.37	20.07
144	17:08:00	15.1	16.4	0.38	20.07
144	17:09:00	14.2	15.7	0.37	20.08
144	17:10:00	13.5	15.5	0.36	20.07
144	17:11:00	14.5	15.6	0.36	20.07
144	17:12:00	13.9	14.9	0.36	20.07
144	17:13:00	13.7	14.7	0.36	20.07
144	17:14:00	14.1	14.5	0.35	20.08
144	17:15:00	13.7	14.5	0.35	20.08
144	17:16:00	14.8	14.2	0.34	20.08

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM15
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 7 - Electrics OFF

No. 12 Pelletizer Hood Exhaust Inlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	17:17:00	16.0	14.1	0.33	20.10
144	17:18:00	14.4	13.9	0.33	20.11
144	17:19:00	12.9	14.1	0.34	20.11
144	17:20:00	12.8	14.0	0.34	20.09
144	17:21:00	12.8	14.1	0.35	20.07
144	17:22:00	14.0	14.0	0.36	20.07
144	17:23:00	16.4	14.5	0.35	20.06
144	17:24:00	16.2	14.3	0.34	20.08
144	17:25:00	14.4	14.6	0.35	20.08
144	17:26:00	13.4	14.8	0.35	20.07
144	17:27:00	13.9	14.8	0.35	20.07
144	17:28:00	14.5	14.5	0.34	20.08
144	17:29:00	14.5	14.5	0.34	20.08
144	17:30:00	13.1	14.5	0.35	20.08
144	17:31:00	12.6	14.0	0.35	20.07
144	17:32:00	13.4	13.7	0.34	20.08
144	17:33:00	13.5	14.3	0.34	20.08
144	17:34:00	13.8	15.0	0.34	20.06
144	17:35:00	14.0	15.2	0.34	20.05
144	17:36:00	14.6	14.9	0.34	20.06
144	17:37:00	14.9	14.8	0.34	20.05
144	17:38:00	14.7	14.4	0.34	20.06
144	17:39:00	14.4	14.3	0.34	20.06
144	17:40:00	14.0	14.4	0.34	20.07
144	17:41:00	13.7	14.1	0.33	20.08
Run Average		14.1	14.6	0.37	20.07

Interpoll Laboratories, Inc.
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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM16
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 7 - Electrics OFF

No. 12 Pelletizer Hood Exhaust Inlet -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	18:08:00	13.5	14.6	0.27	20.04
144	18:09:00	14.6	15.0	0.27	20.03
144	18:10:00	15.4	15.2	0.26	20.04
144	18:11:00	15.3	15.8	0.25	20.05
144	18:12:00	14.7	16.1	0.25	20.05
144	18:13:00	13.3	16.0	0.25	20.04
144	18:14:00	12.4	15.8	0.25	20.03
144	18:15:00	13.2	15.3	0.25	20.01
144	18:16:00	14.4	14.9	0.25	20.01
144	18:17:00	14.7	15.3	0.25	20.01
144	18:18:00	14.4	15.4	0.25	19.99
144	18:19:00	14.2	15.1	0.25	19.99
144	18:20:00	14.9	15.2	0.25	19.99
144	18:21:00	15.4	15.1	0.25	19.99
144	18:22:00	16.0	15.7	0.25	20.00
144	18:23:00	15.6	15.7	0.24	20.01
144	18:24:00	14.5	14.9	0.23	20.05
144	18:25:00	14.0	14.7	0.23	20.04
144	18:26:00	14.6	14.7	0.22	20.04
144	18:27:00	13.8	14.5	0.22	20.05
144	18:28:00	13.4	14.6	0.22	20.05
144	18:29:00	13.0	14.8	0.22	20.05
144	18:30:00	12.2	14.7	0.23	20.03
144	18:31:00	14.0	14.4	0.22	20.02
144	18:32:00	16.2	14.5	0.21	20.03
144	18:33:00	15.8	14.3	0.21	20.06
144	18:34:00	14.9	14.3	0.21	20.07
144	18:35:00	13.2	13.9	0.21	20.07
144	18:36:00	12.7	14.1	0.22	20.06
144	18:37:00	13.8	14.0	0.22	20.06
144	18:38:00	15.1	14.2	0.21	20.06
144	18:39:00	14.3	13.8	0.20	20.08
144	18:40:00	13.6	14.0	0.20	20.08
144	18:41:00	13.0	14.3	0.21	20.06

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM16
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 7 - Electrics OFF
No. 12 Pelletizer Hood Exhaust Inlet -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	18:42:00	12.8	14.6	0.22	20.04
144	18:43:00	13.5	14.7	0.22	20.03
144	18:44:00	14.7	15.1	0.23	20.02
144	18:45:00	14.8	15.4	0.24	20.01
144	18:46:00	14.8	14.9	0.23	20.02
144	18:47:00	15.6	14.3	0.22	20.04
144	18:48:00	14.6	14.4	0.21	20.06
144	18:49:00	13.7	15.0	0.21	20.05
144	18:50:00	13.4	14.8	0.21	20.05
144	18:51:00	13.7	14.5	0.21	20.06
144	18:52:00	13.5	14.6	0.21	20.05
144	18:53:00	13.1	14.6	0.22	20.04
144	18:54:00	14.1	14.6	0.21	20.03
144	18:55:00	14.9	14.9	0.21	20.03
144	18:56:00	14.3	14.4	0.21	20.05
144	18:57:00	14.4	14.6	0.21	20.04
144	18:58:00	14.1	14.9	0.21	20.02
144	18:59:00	14.2	14.9	0.22	20.01
144	19:00:00	14.3	15.3	0.22	20.01
144	19:01:00	14.0	15.2	0.23	19.99
144	19:02:00	14.4	15.1	0.23	19.99
144	19:03:00	15.2	15.1	0.23	19.98
144	19:04:00	15.7	15.3	0.24	19.99
144	19:05:00	16.0	15.4	0.23	20.00
144	19:06:00	15.2	15.8	0.24	20.00
Run Average		14.3	14.9	0.23	20.03

Interpoll Laboratories, Inc.
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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM21
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 2 - Electrics ON

No. 12 Pelletizer Hood Exhaust Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	09:54:00	4.5	6.0	0.29	19.90
144	09:55:00	4.2	6.2	0.29	19.93
144	09:56:00	4.1	6.0	0.29	19.94
144	09:57:00	4.0	5.8	0.28	19.96
144	09:58:00	4.1	6.1	0.29	19.98
144	09:59:00	4.0	6.0	0.29	19.99
144	10:00:00	3.7	5.7	0.29	19.99
144	10:01:00	3.6	5.5	0.28	20.00
144	10:02:00	3.6	5.7	0.28	20.00
144	10:03:00	3.7	6.1	0.28	20.00
144	10:04:00	4.0	6.1	0.28	20.00
144	10:05:00	4.4	6.0	0.28	19.99
144	10:06:00	4.1	6.1	0.28	19.99
144	10:07:00	3.5	6.1	0.29	19.99
144	10:08:00	3.7	5.9	0.29	19.98
144	10:09:00	4.1	5.9	0.28	19.98
144	10:10:00	4.2	5.6	0.27	19.99
144	10:11:00	3.6	5.8	0.27	20.01
144	10:12:00	3.4	6.1	0.28	20.02
144	10:13:00	3.2	6.0	0.28	20.02
144	10:14:00	3.4	6.2	0.28	20.00
144	10:15:00	3.2	6.4	0.29	19.99
144	10:16:00	3.1	6.5	0.30	19.97
144	10:17:00	3.5	6.4	0.30	19.94
144	10:18:00	3.9	6.4	0.30	19.93
144	10:19:00	4.2	6.1	0.29	19.93
144	10:20:00	4.2	6.4	0.29	19.95
144	10:21:00	4.0	6.2	0.29	19.94
144	10:22:00	3.7	6.0	0.29	19.93
144	10:23:00	4.0	6.0	0.29	19.93
144	10:24:00	4.4	5.9	0.28	19.93
144	10:25:00	3.8	6.0	0.28	19.95
144	10:26:00	3.2	5.8	0.28	19.95
144	10:27:00	3.4	6.1	0.29	19.94

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM21
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 2 - Electrics ON
No. 12 Pelletizer Hood Exhaust Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	10:28:00	4.1	6.2	0.28	19.95
144	10:29:00	4.4	6.4	0.28	19.94
144	10:30:00	4.1	6.2	0.27	19.95
144	10:31:00	3.9	6.1	0.27	19.96
144	10:32:00	3.9	6.1	0.27	19.97
144	10:33:00	3.5	5.8	0.27	19.97
144	10:34:00	3.4	5.6	0.26	19.97
144	10:35:00	3.7	5.6	0.25	19.98
144	10:36:00	3.7	5.9	0.26	19.98
144	10:37:00	3.3	6.0	0.28	19.98
144	10:38:00	3.2	6.0	0.28	19.95
144	10:39:00	3.9	5.8	0.27	19.94
144	10:40:00	3.9	6.1	0.27	19.93
144	10:41:00	4.2	6.1	0.27	19.93
144	10:42:00	4.4	5.9	0.26	19.94
144	10:43:00	3.9	5.8	0.26	19.96
144	10:44:00	3.2	5.7	0.26	19.97
144	10:45:00	3.0	5.7	0.26	19.97
144	10:46:00	3.3	6.0	0.27	19.97
144	10:47:00	3.5	6.1	0.28	19.96
144	10:48:00	3.3	6.0	0.28	19.94
144	10:49:00	3.5	5.9	0.28	19.92
144	10:50:00	3.8	5.9	0.28	19.91
144	10:51:00	4.2	6.2	0.28	19.91
144	10:52:00	4.7	6.9	0.28	19.91
Run Average		3.8	6.0	0.28	19.96

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM22
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 2- Electrics ON

No. 12 Pelletizer Hood Exhaust Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	11:49:00	3.4	5.4	0.17	21.22
144	11:50:00	3.7	5.4	0.17	21.22
144	11:51:00	4.1	5.5	0.17	21.22
144	11:52:00	3.8	6.0	0.18	21.19
144	11:53:00	3.4	6.0	0.19	21.17
144	11:54:00	3.5	5.9	0.19	21.17
144	11:55:00	3.6	6.0	0.19	21.16
144	11:56:00	3.8	6.1	0.19	21.15
144	11:57:00	4.3	5.8	0.19	21.17
144	11:58:00	4.2	5.7	0.19	21.17
144	11:59:00	3.8	5.5	0.18	21.18
144	12:00:00	3.8	5.7	0.18	21.17
144	12:01:00	4.0	5.8	0.18	21.17
144	12:02:00	4.0	5.8	0.18	21.18
144	12:03:00	3.6	5.7	0.18	21.17
144	12:04:00	3.6	5.7	0.18	21.17
144	12:05:00	3.7	5.7	0.18	21.17
144	12:06:00	4.0	5.7	0.18	21.16
144	12:07:00	4.1	6.0	0.18	21.17
144	12:08:00	4.3	5.9	0.18	21.17
144	12:09:00	4.0	5.7	0.18	21.18
144	12:10:00	3.8	5.6	0.18	21.17
144	12:11:00	4.3	5.6	0.17	21.17
144	12:12:00	4.2	5.7	0.18	21.17
144	12:13:00	3.9	6.0	0.17	21.18
144	12:14:00	3.9	6.4	0.17	21.17
144	12:15:00	3.7	6.2	0.18	21.17
144	12:16:00	3.9	6.2	0.17	21.17
144	12:17:00	4.2	6.0	0.16	21.19
144	12:18:00	3.9	5.7	0.16	21.19
144	12:19:00	3.5	5.3	0.16	21.19
144	12:20:00	3.4	5.2	0.16	21.19
144	12:21:00	3.2	5.0	0.16	21.18
144	12:22:00	3.5	5.3	0.16	21.17

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM22
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 2 - Electrics ON

No. 12 Pelletizer Hood Exhaust Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	12:23:00	3.9	5.3	0.16	21.17
144	12:24:00	4.0	5.6	0.16	21.18
144	12:25:00	4.1	5.5	0.15	21.19
144	12:26:00	3.9	5.6	0.16	21.19
144	12:27:00	3.6	5.5	0.15	21.20
144	12:28:00	3.7	5.6	0.15	21.20
144	12:29:00	3.7	5.7	0.15	21.19
144	12:30:00	3.5	5.5	0.15	21.19
144	12:31:00	3.3	5.4	0.16	21.18
144	12:32:00	3.5	5.2	0.15	21.20
144	12:33:00	3.5	5.4	0.15	21.19
144	12:34:00	3.8	5.7	0.15	21.17
144	12:35:00	3.7	5.5	0.15	21.18
144	12:36:00	3.7	5.4	0.15	21.19
144	12:37:00	3.5	5.5	0.16	21.17
144	12:38:00	3.6	5.5	0.16	21.17
144	12:39:00	3.8	5.3	0.15	21.19
144	12:40:00	4.0	5.3	0.15	21.19
144	12:41:00	3.6	5.2	0.14	21.20
144	12:42:00	3.3	5.3	0.14	21.20
144	12:43:00	3.6	5.5	0.15	21.19
144	12:44:00	3.6	5.4	0.14	21.20
144	12:45:00	3.6	5.4	0.14	21.20
144	12:46:00	3.2	5.5	0.15	21.17
144	12:47:00	3.5	5.3	0.14	21.18
Run Average		3.8	5.6	0.17	21.18

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM23
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 2 - Electrics ON

No. 12 Pelletizer Hood Exhaust Stack -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	13:29:00	3.0	5.7	0.19	20.70
144	13:30:00	2.8	5.6	0.20	20.68
144	13:31:00	3.2	5.5	0.19	20.68
144	13:32:00	3.5	5.5	0.19	20.68
144	13:33:00	3.3	5.6	0.19	20.68
144	13:34:00	2.8	5.7	0.20	20.66
144	13:35:00	2.7	5.5	0.20	20.65
144	13:36:00	2.6	5.4	0.20	20.64
144	13:37:00	2.9	5.7	0.21	20.62
144	13:38:00	3.0	5.7	0.20	20.62
144	13:39:00	3.3	5.8	0.20	20.63
144	13:40:00	3.1	5.7	0.20	20.64
144	13:41:00	2.7	5.4	0.19	20.65
144	13:42:00	2.5	5.0	0.18	20.66
144	13:43:00	2.5	5.0	0.18	20.66
144	13:44:00	2.4	5.0	0.19	20.65
144	13:45:00	2.4	5.0	0.19	20.64
144	13:46:00	2.5	4.9	0.19	20.65
144	13:47:00	2.7	4.6	0.17	20.68
144	13:48:00	3.0	4.8	0.17	20.70
144	13:49:00	3.1	5.0	0.16	20.72
144	13:50:00	2.8	4.9	0.16	20.73
144	13:51:00	1.9	5.0	0.16	20.73
144	13:52:00	1.9	5.3	0.17	20.71
144	13:53:00	1.6	5.3	0.17	20.70
144	14:19:00	0.6	5.5	0.15	20.65
144	14:20:00	0.8	5.5	0.16	20.64
144	14:21:00	1.1	5.3	0.15	20.65
144	14:22:00	1.7	5.5	0.15	20.65
144	14:23:00	1.2	5.0	0.15	20.66
144	14:24:00	1.4	4.8	0.14	20.67
144	14:25:00	1.2	5.1	0.15	20.66
144	14:26:00	1.3	5.3	0.15	20.65
144	14:27:00	1.7	5.3	0.15	20.66

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM23
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 2 - Electrics ON

No. 12 Pelletizer Hood Exhaust Stack -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	14:28:00	1.8	5.1	0.15	20.67
144	14:29:00	1.4	5.2	0.15	20.66
144	14:30:00	1.0	4.9	0.15	20.65
144	14:31:00	1.0	5.1	0.14	20.66
144	14:32:00	1.0	5.3	0.15	20.65
144	14:33:00	1.2	5.4	0.16	20.63
144	14:34:00	1.0	5.3	0.16	20.64
144	14:35:00	1.5	5.2	0.15	20.65
144	14:36:00	1.9	5.2	0.14	20.67
144	14:37:00	1.7	5.4	0.14	20.68
144	14:38:00	1.4	5.3	0.13	20.69
144	14:39:00	1.1	5.1	0.13	20.71
144	14:40:00	0.8	5.0	0.13	20.70
144	14:41:00	1.0	5.1	0.13	20.69
144	14:42:00	0.8	5.1	0.14	20.67
144	14:43:00	0.7	5.0	0.14	20.67
144	14:44:00	1.0	5.1	0.14	20.67
144	14:45:00	1.1	5.6	0.15	20.64
144	14:46:00	1.2	5.6	0.14	20.65
144	14:47:00	1.7	5.6	0.14	20.66
144	14:48:00	1.8	5.6	0.14	20.66
144	14:49:00	1.5	5.8	0.15	20.64
144	14:50:00	1.5	5.1	0.14	20.65
144	14:51:00	1.4	4.8	0.13	20.66
144	14:52:00	1.7	4.9	0.13	20.66
144	14:53:00	2.0	5.0	0.13	20.66
Run Average		1.9	5.3	0.16	20.66

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM24
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 6 - Electrics OFF

No. 12 Pelletizer Hood Exhaust Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	15:24:00	2.3	5.6	0.26	20.14
144	15:25:00	2.3	5.4	0.25	20.16
144	15:26:00	1.9	5.1	0.25	20.17
144	15:27:00	1.6	4.8	0.24	20.18
144	15:28:00	1.8	5.1	0.24	20.17
144	15:29:00	1.7	4.8	0.24	20.18
144	15:30:00	1.6	4.7	0.23	20.19
144	15:31:00	1.7	4.6	0.23	20.20
144	15:32:00	1.5	4.6	0.23	20.19
144	15:33:00	1.1	4.8	0.24	20.17
144	15:34:00	1.1	4.9	0.24	20.17
144	15:35:00	1.4	4.9	0.24	20.17
144	15:36:00	1.7	4.9	0.23	20.17
144	15:37:00	1.7	5.6	0.24	20.15
144	15:38:00	1.3	5.7	0.25	20.14
144	15:39:00	1.1	5.6	0.25	20.13
144	15:40:00	1.2	5.6	0.24	20.14
144	15:41:00	1.4	5.8	0.25	20.13
144	15:42:00	1.3	5.9	0.25	20.13
144	15:43:00	1.3	5.5	0.25	20.12
144	15:44:00	0.9	5.4	0.25	20.11
144	15:45:00	0.8	5.3	0.25	20.10
144	15:46:00	1.3	5.3	0.24	20.11
144	15:47:00	1.7	5.3	0.24	20.13
144	15:48:00	1.7	5.3	0.24	20.14
144	15:49:00	1.4	5.2	0.24	20.15
144	15:50:00	1.2	5.1	0.24	20.14
144	15:51:00	1.2	5.1	0.23	20.14
144	15:52:00	1.4	5.4	0.24	20.13
144	15:53:00	1.5	5.4	0.24	20.14
144	15:54:00	1.3	5.2	0.23	20.15
144	15:55:00	1.3	5.1	0.24	20.14
144	15:56:00	1.5	5.0	0.23	20.15
144	15:57:00	1.5	5.1	0.24	20.14

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM24
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 6 - Electrics OFF

No. 12 Pelletizer Hood Exhaust Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	15:58:00	1.4	5.2	0.24	20.14
144	15:59:00	1.3	5.1	0.23	20.14
144	16:00:00	1.2	5.0	0.23	20.13
144	16:01:00	1.4	5.0	0.23	20.13
144	16:02:00	2.0	5.2	0.23	20.15
144	16:03:00	1.8	5.5	0.23	20.15
144	16:04:00	1.5	5.7	0.23	20.16
144	16:05:00	1.2	5.7	0.23	20.15
144	16:06:00	0.9	5.4	0.23	20.14
144	16:07:00	0.9	5.9	0.24	20.13
144	16:08:00	1.3	6.1	0.23	20.12
144	16:09:00	1.8	5.9	0.22	20.15
144	16:10:00	1.5	5.7	0.22	20.14
144	16:11:00	1.2	5.8	0.23	20.14
144	16:12:00	1.1	5.7	0.23	20.13
144	16:13:00	1.4	5.6	0.23	20.12
144	16:14:00	1.6	5.6	0.23	20.13
144	16:15:00	1.4	5.7	0.24	20.11
144	16:16:00	1.1	5.5	0.24	20.10
144	16:17:00	1.0	5.2	0.23	20.12
144	16:18:00	1.2	5.5	0.23	20.13
144	16:19:00	1.4	5.8	0.23	20.13
144	16:20:00	1.6	5.7	0.22	20.14
144	16:21:00	1.3	5.7	0.22	20.15
144	16:22:00	1.5	4.2	1.18	20.04
Run Average		1.4	5.3	0.25	20.14

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM25
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 6 - Electrics OFF
No. 12 Pelletizer Hood Exhaust Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	16:44:00	3.2	5.3	0.24	20.13
144	16:45:00	3.2	5.8	0.24	20.14
144	16:46:00	3.4	5.5	0.23	20.15
144	16:47:00	3.2	5.5	0.23	20.16
144	16:48:00	3.1	5.5	0.24	20.15
144	16:49:00	2.8	5.4	0.24	20.15
144	16:50:00	3.0	5.3	0.23	20.14
144	16:51:00	3.1	5.3	0.23	20.15
144	16:52:00	2.9	5.7	0.24	20.13
144	16:53:00	2.9	5.3	0.25	20.11
144	16:54:00	2.8	5.2	0.25	20.10
144	16:55:00	3.0	5.4	0.25	20.10
144	16:56:00	3.4	5.4	0.25	20.11
144	16:57:00	3.5	5.4	0.24	20.12
144	16:58:00	3.6	5.3	0.24	20.13
144	16:59:00	3.3	5.3	0.24	20.12
144	17:00:00	2.9	5.2	0.24	20.13
144	17:01:00	3.0	5.1	0.24	20.12
144	17:02:00	3.1	5.2	0.24	20.13
144	17:03:00	2.8	5.4	0.24	20.13
144	17:04:00	2.7	5.3	0.24	20.12
144	17:05:00	2.8	5.2	0.24	20.13
144	17:06:00	2.9	5.7	0.24	20.13
144	17:07:00	3.3	6.1	0.25	20.12
144	17:08:00	3.6	6.1	0.25	20.13
144	17:09:00	3.5	5.9	0.24	20.14
144	17:10:00	3.1	5.8	0.25	20.13
144	17:11:00	3.1	5.7	0.24	20.12
144	17:12:00	3.5	5.5	0.25	20.12
144	17:13:00	3.3	5.5	0.24	20.13
144	17:14:00	3.3	5.4	0.24	20.13
144	17:15:00	3.4	5.4	0.25	20.13
144	17:16:00	3.2	5.3	0.25	20.13
144	17:17:00	3.7	5.2	0.27	20.15

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM25
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 6 - Electrics OFF
No. 12 Pelletizer Hood Exhaust Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	17:18:00	3.6	5.2	0.29	20.16
144	17:19:00	3.1	5.2	0.31	20.14
144	17:20:00	2.8	5.2	0.32	20.13
144	17:21:00	2.9	5.1	0.33	20.11
144	17:22:00	3.1	5.3	0.34	20.10
144	17:23:00	3.6	5.3	0.34	20.11
144	17:24:00	4.1	5.5	0.34	20.12
144	17:25:00	3.6	5.4	0.34	20.11
144	17:26:00	3.0	5.6	0.35	20.10
144	17:27:00	3.0	5.4	0.35	20.11
144	17:28:00	3.1	5.3	0.34	20.11
144	17:29:00	3.3	5.4	0.34	20.12
144	17:30:00	3.2	5.4	0.35	20.10
144	17:31:00	2.8	5.1	0.35	20.10
144	17:32:00	3.1	4.9	0.34	20.11
144	17:33:00	3.1	5.4	0.35	20.10
144	17:34:00	3.1	5.7	0.35	20.09
144	17:35:00	3.2	5.7	0.35	20.08
144	17:36:00	3.3	5.5	0.35	20.08
144	17:37:00	3.6	5.5	0.36	20.08
144	17:38:00	3.8	5.4	0.36	20.08
144	17:39:00	3.7	5.3	0.36	20.08
144	17:40:00	3.5	5.3	0.36	20.09
144	17:41:00	3.1	5.2	0.35	20.09
144	17:42:00	3.0	5.2	0.35	20.09
Run Average		3.2	5.4	0.29	20.12

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM26
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 6 - Electrics OFF

No. 12 Pelletizer Hood Exhaust Stack -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	18:09:00	4.0	5.6	0.38	19.98
144	18:10:00	4.4	6.0	0.38	19.99
144	18:11:00	4.4	6.1	0.38	20.00
144	18:12:00	4.2	6.3	0.38	20.00
144	18:13:00	3.7	6.1	0.38	19.99
144	18:14:00	3.2	6.0	0.39	19.97
144	18:15:00	3.3	5.7	0.39	19.96
144	18:16:00	3.7	5.7	0.38	19.95
144	18:17:00	3.8	5.9	0.39	19.94
144	18:18:00	3.9	5.8	0.39	19.93
144	18:19:00	3.6	5.8	0.39	19.93
144	18:20:00	4.1	5.7	0.39	19.92
144	18:21:00	4.1	5.8	0.39	19.92
144	18:22:00	4.4	6.0	0.39	19.93
144	18:23:00	4.5	5.7	0.38	19.96
144	18:24:00	4.1	5.6	0.38	19.98
144	18:25:00	4.0	5.4	0.37	19.98
144	18:26:00	4.1	5.2	0.37	19.98
144	18:27:00	3.8	5.3	0.37	19.98
144	18:28:00	3.6	5.4	0.36	19.98
144	18:29:00	3.7	5.4	0.37	19.97
144	18:30:00	3.6	5.3	0.38	19.95
144	18:31:00	3.7	5.2	0.37	19.95
144	18:32:00	4.5	5.2	0.36	19.97
144	18:33:00	4.8	5.2	0.36	20.00
144	18:34:00	4.6	5.1	0.36	20.01
144	18:35:00	4.0	5.1	0.36	20.00
144	18:36:00	3.6	4.9	0.36	20.00
144	18:37:00	3.9	5.1	0.36	19.99
144	18:38:00	4.5	5.1	0.36	19.99
144	18:39:00	4.7	4.9	0.35	20.02
144	18:40:00	4.5	5.0	0.36	20.01
144	18:41:00	4.1	5.3	0.37	19.99
144	18:42:00	4.0	5.4	0.37	19.97

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM26
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 6 - Electrics OFF

No. 12 Pelletizer Hood Exhaust Stack -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
144	18:43:00	3.9	5.5	0.37	19.96
144	18:44:00	4.1	5.6	0.38	19.94
144	18:45:00	4.3	5.8	0.38	19.93
144	18:46:00	4.4	5.5	0.38	19.95
144	18:47:00	4.5	5.2	0.36	19.97
144	18:48:00	4.6	5.4	0.36	19.98
144	18:49:00	4.3	5.7	0.37	19.97
144	18:50:00	4.1	5.5	0.37	19.98
144	18:51:00	3.8	5.4	0.36	19.98
144	18:52:00	3.9	5.4	0.37	19.97
144	18:53:00	3.9	5.5	0.37	19.96
144	18:54:00	4.2	5.5	0.37	19.95
144	18:55:00	4.5	5.4	0.37	19.96
144	18:56:00	4.5	5.4	0.36	19.97
144	18:57:00	4.4	5.4	0.36	19.96
144	18:58:00	4.5	5.5	0.37	19.95
144	18:59:00	4.5	5.6	0.37	19.94
144	19:00:00	4.6	5.7	0.37	19.94
144	19:01:00	4.3	5.7	0.38	19.92
144	19:02:00	4.5	5.5	0.38	19.92
144	19:03:00	4.6	5.6	0.38	19.92
144	19:04:00	4.8	5.7	0.38	19.92
144	19:05:00	5.0	5.8	0.38	19.93
144	19:06:00	5.1	6.0	0.39	19.91
144	19:07:00	4.8	5.8	0.38	19.92
Run Average		4.2	5.5	0.37	19.96

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM81
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 8 Electrics ON
No. 12 Pelletizer Waste Gas Inlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	09:28:00	6.0	100	2.07	16.79
145	09:29:00	5.8	99.6	2.09	16.74
145	09:30:00	5.2	99.8	2.09	16.73
145	09:31:00	5.4	101	2.09	16.71
145	09:32:00	5.2	101	2.08	16.74
145	09:33:00	5.3	101	2.08	16.75
145	09:34:00	5.6	100	2.07	16.76
145	09:35:00	5.8	102	2.09	16.74
145	09:36:00	5.8	103	2.10	16.71
145	09:37:00	5.7	103	2.10	16.70
145	09:38:00	5.7	103	2.11	16.69
145	09:39:00	5.7	104	2.12	16.67
145	09:40:00	5.9	104	2.12	16.65
145	09:41:00	6.1	105	2.12	16.67
145	09:42:00	6.0	105	2.11	16.68
145	09:43:00	6.1	106	2.11	16.69
145	09:44:00	6.0	106	2.11	16.70
145	09:45:00	5.9	107	2.12	16.68
145	09:46:00	5.7	106	2.12	16.67
145	09:47:00	5.8	103	2.11	16.69
145	09:48:00	5.8	101	2.10	16.71
145	09:49:00	5.9	99.4	2.12	16.69
145	09:50:00	6.2	100.0	2.12	16.66
145	09:51:00	6.1	103	2.11	16.68
145	09:52:00	5.9	104	2.09	16.71
145	09:53:00	5.9	107	2.11	16.68
145	09:54:00	6.0	108	2.12	16.66
145	09:55:00	6.0	107	2.12	16.66
145	09:56:00	5.8	104	2.10	16.69
145	09:57:00	5.9	104	2.10	16.71
145	09:58:00	5.9	105	2.12	16.70
145	09:59:00	5.6	106	2.12	16.67
145	10:00:00	5.5	107	2.13	16.66
145	10:01:00	5.7	105	2.11	16.69

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM81
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 8 - Electrics ON

No. 12 Pelletizer Waste Gas Inlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	10:02:00	5.8	106	2.10	16.70
145	10:03:00	6.0	107	2.10	16.74
145	10:04:00	6.1	104	2.08	16.76
145	10:05:00	6.2	103	2.09	16.72
145	10:06:00	5.8	101	2.10	16.71
145	10:07:00	5.9	103	2.12	16.69
145	10:08:00	6.0	103	2.11	16.69
145	10:09:00	5.8	102	2.10	16.70
145	10:10:00	5.6	103	2.09	16.70
145	10:11:00	5.8	101	2.09	16.72
145	10:12:00	5.9	102	2.08	16.74
145	10:13:00	5.8	103	2.08	16.73
145	10:14:00	5.7	103	2.07	16.76
145	10:15:00	5.8	104	2.08	16.75
145	10:16:00	5.9	105	2.08	16.75
145	10:17:00	5.8	104	2.10	16.72
145	10:18:00	5.8	104	2.11	16.69
145	10:19:00	5.8	105	2.12	16.66
145	10:20:00	6.0	105	2.12	16.66
145	10:21:00	5.6	106	2.12	16.67
145	10:22:00	5.8	107	2.13	16.66
145	10:23:00	5.8	108	2.12	16.65
145	10:24:00	6.1	108	2.13	16.65
145	10:25:00	6.2	107	2.13	16.64
145	10:26:00	6.1	105	2.12	16.68
Run Average		5.8	104	2.10	16.70

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM82
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 8 - Electrics ON

No. 12 Pelletizer Waste Gas Inlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	11:13:00	6.2	102	2.08	16.68
145	11:14:00	6.3	104	2.09	16.67
145	11:15:00	6.2	106	2.09	16.70
145	11:16:00	6.4	113	2.11	16.68
145	11:17:00	6.5	116	2.12	16.65
145	11:18:00	6.6	117	2.11	16.68
145	11:19:00	6.6	117	2.09	16.72
145	11:20:00	6.5	113	2.09	16.71
145	11:21:00	6.4	108	2.08	16.73
145	11:22:00	6.2	108	2.08	16.71
145	11:23:00	6.6	109	2.07	16.73
145	11:24:00	6.4	107	2.06	16.74
145	11:25:00	6.4	104	2.05	16.76
145	11:26:00	6.2	103	2.05	16.75
145	11:27:00	6.2	101	2.04	16.77
145	11:28:00	5.9	102	2.05	16.76
145	11:29:00	5.8	103	2.07	16.72
145	11:30:00	5.7	105	2.07	16.70
145	11:31:00	5.9	107	2.08	16.69
145	11:32:00	5.8	107	2.08	16.68
145	11:33:00	6.0	107	2.07	16.72
145	11:34:00	6.3	110	2.11	16.65
145	11:35:00	6.5	111	2.11	16.62
145	11:36:00	6.3	111	2.10	16.65
145	11:37:00	6.4	110	2.10	16.65
145	11:38:00	6.1	109	2.11	16.64
145	11:39:00	6.2	109	2.12	16.62
145	11:40:00	6.2	108	2.12	16.61
145	11:41:00	6.1	106	2.10	16.64
145	11:42:00	6.3	102	2.11	16.66
145	11:43:00	6.4	107	2.11	16.63
145	11:44:00	6.7	116	2.12	16.64
145	11:45:00	6.9	120	2.12	16.65
145	11:46:00	6.8	118	2.12	16.67

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM82
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 8 - Electrics ON

No. 12 Pelletizer Waste Gas Inlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	11:47:00	6.3	116	2.11	16.67
145	11:48:00	6.3	110	2.10	16.68
145	11:49:00	6.3	109	2.09	16.69
145	11:50:00	6.2	108	2.08	16.71
145	11:51:00	6.0	109	2.08	16.70
145	11:52:00	5.9	107	2.09	16.70
145	11:53:00	6.2	109	2.10	16.65
145	11:54:00	6.3	109	2.09	16.67
145	11:55:00	6.4	109	2.09	16.69
145	11:56:00	6.5	111	2.08	16.73
145	11:57:00	6.3	110	2.08	16.71
145	11:58:00	6.0	107	2.07	16.74
145	11:59:00	6.0	104	2.06	16.77
145	12:00:00	6.0	105	2.08	16.72
145	12:01:00	5.9	107	2.07	16.74
145	12:02:00	5.9	108	2.07	16.75
145	12:03:00	6.0	107	2.06	16.76
145	12:04:00	6.3	107	2.06	16.76
145	12:05:00	6.3	107	2.07	16.76
145	12:06:00	6.2	102	2.07	16.75
145	12:07:00	6.2	102	2.07	16.74
145	12:08:00	6.2	109	2.10	16.69
145	12:09:00	6.2	112	2.12	16.64
145	12:10:00	6.1	113	2.14	16.58
145	12:11:00	6.0	113	2.12	16.62
Run Average		6.2	108	2.09	16.69

Interpoll Laboratories, Inc.
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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM83
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 8 - Electrics ON

No. 12 Pelletizer Waste Gas Inlet -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	12:58:00	5.8	106	2.23	16.81
145	12:59:00	6.0	106	2.22	16.82
145	13:00:00	6.5	106	2.22	16.83
145	13:01:00	6.3	106	2.22	16.84
145	13:02:00	6.0	107	2.21	16.88
145	13:03:00	6.0	108	2.21	16.85
145	13:04:00	6.4	108	2.21	16.88
145	13:05:00	6.8	107	2.20	16.87
145	13:06:00	6.9	106	2.19	16.90
145	13:07:00	6.8	107	2.20	16.91
145	13:08:00	6.6	110	2.20	16.85
145	13:09:00	6.6	110	2.22	16.81
145	13:10:00	6.0	110	2.21	16.82
145	13:11:00	5.7	109	2.21	16.82
145	13:12:00	5.6	107	2.23	16.79
145	13:13:00	5.7	105	2.24	16.78
145	13:14:00	6.4	104	2.25	16.77
145	13:15:00	6.7	104	2.23	16.78
145	13:16:00	6.9	108	2.24	16.78
145	13:17:00	7.1	114	2.24	16.80
145	13:18:00	7.0	117	2.24	16.80
145	13:19:00	6.7	119	2.24	16.80
145	13:20:00	6.2	121	2.26	16.77
145	13:21:00	5.8	121	2.26	16.75
145	13:22:00	5.7	111	2.24	16.75
145	13:23:00	5.5	109	2.25	16.73
145	13:24:00	5.8	110	2.27	16.69
145	13:25:00	6.1	108	2.25	16.72
145	13:26:00	6.7	112	2.27	16.73
145	13:27:00	7.0	115	2.26	16.76
145	13:28:00	7.0	112	2.25	16.77
145	13:29:00	7.1	109	2.23	16.80
145	13:30:00	6.9	108	2.23	16.80
145	13:31:00	6.3	108	2.24	16.76

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM83
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 8 - Electrics ON
No. 12 Pelletizer Waste Gas Inlet -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	13:32:00	5.9	107	2.25	16.73
145	13:33:00	5.4	108	2.25	16.73
145	13:34:00	5.5	110	2.25	16.73
145	13:35:00	5.8	113	2.25	16.71
145	13:36:00	6.1	119	2.25	16.75
145	13:37:00	6.7	121	2.22	16.79
145	13:38:00	6.8	119	2.23	16.81
145	13:39:00	7.1	108	2.23	16.79
145	13:40:00	6.9	108	2.22	16.81
145	13:41:00	6.3	105	2.21	16.84
145	13:42:00	5.8	105	2.22	16.82
145	13:43:00	5.7	107	2.24	16.82
145	13:44:00	5.6	108	2.23	16.81
145	13:45:00	6.0	110	2.23	16.81
145	13:46:00	6.3	112	2.22	16.84
145	13:47:00	6.9	115	2.21	16.84
145	13:48:00	7.3	120	2.20	16.88
145	13:49:00	7.2	118	2.18	16.92
145	13:50:00	6.8	109	2.17	16.90
145	13:51:00	6.4	106	2.17	16.91
145	13:52:00	6.1	104	2.19	16.87
145	13:53:00	6.0	101	2.20	16.85
145	13:54:00	5.8	99.7	2.20	16.83
145	13:55:00	5.8	101	2.21	16.82
145	13:56:00	6.1	103	2.22	16.82
Run Average		6.3	110	2.23	16.81

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM91
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 9 - Electrics OFF

No. 12 Pelletizer Waste Gas Inlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	14:33:00	6.4	110	2.15	16.62
145	14:34:00	6.5	110	2.14	16.67
145	14:35:00	6.3	109	2.15	16.66
145	14:36:00	6.0	104	2.14	16.65
145	14:37:00	6.1	102	2.14	16.66
145	14:38:00	6.2	105	2.18	16.60
145	14:39:00	6.3	110	2.19	16.57
145	14:40:00	6.7	114	2.19	16.60
145	14:41:00	6.8	117	2.19	16.60
145	14:42:00	6.9	119	2.19	16.61
145	14:43:00	6.7	122	2.20	16.60
145	14:44:00	6.8	123	2.19	16.61
145	14:45:00	6.8	115	2.17	16.62
145	14:46:00	6.7	111	2.17	16.62
145	14:47:00	6.4	106	2.16	16.63
145	14:48:00	6.7	104	2.17	16.61
145	14:49:00	6.8	105	2.17	16.60
145	14:50:00	6.6	108	2.16	16.63
145	14:51:00	6.6	110	2.16	16.64
145	14:52:00	6.6	111	2.16	16.64
145	14:53:00	6.9	110	2.17	16.64
145	14:54:00	6.8	109	2.18	16.61
145	14:55:00	6.8	108	2.17	16.63
145	14:56:00	6.9	108	2.17	16.63
145	14:57:00	7.0	110	2.17	16.64
145	14:58:00	6.7	111	2.17	16.65
145	14:59:00	6.8	111	2.17	16.65
145	15:00:00	7.0	113	2.19	16.61
145	15:01:00	7.2	112	2.18	16.60
145	15:02:00	7.1	112	2.17	16.63
145	15:03:00	7.0	109	2.16	16.66
145	15:04:00	7.1	106	2.16	16.64
145	15:05:00	6.6	104	2.15	16.66
145	15:06:00	6.7	105	2.15	16.67

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM91
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 9 - Electrics OFF

No. 12 Pelletizer Waste Gas Inlet -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	15:07:00	6.6	106	2.14	16.68
145	15:08:00	6.6	108	2.13	16.69
145	15:09:00	6.6	108	2.13	16.70
145	15:10:00	6.5	106	2.13	16.71
145	15:11:00	6.6	108	2.13	16.71
145	15:12:00	6.4	109	2.14	16.68
145	15:13:00	6.4	110	2.16	16.65
145	15:14:00	6.7	111	2.17	16.61
145	15:15:00	6.8	110	2.17	16.62
145	15:16:00	6.7	108	2.17	16.62
145	15:17:00	6.8	108	2.18	16.62
145	15:18:00	7.0	107	2.17	16.62
145	15:19:00	7.0	109	2.17	16.61
145	15:20:00	7.2	109	2.17	16.63
145	15:21:00	7.1	110	2.17	16.60
145	15:22:00	6.9	110	2.17	16.59
145	15:23:00	7.1	110	2.18	16.57
145	15:24:00	6.8	107	2.17	16.62
145	15:25:00	6.7	107	2.18	16.58
145	15:26:00	6.8	110	2.19	16.56
145	15:27:00	6.8	110	2.18	16.58
145	15:28:00	7.1	110	2.16	16.63
145	15:29:00	7.2	109	2.16	16.63
145	15:30:00	6.8	114	2.17	16.63
145	15:31:00	6.7	117	2.18	16.60
Run Average		6.7	110	2.17	16.63

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM92
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 9 - Electrics OFF

No. 12 Pelletizer Waste Gas Inlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	16:00:00	7.3	111	2.31	16.64
145	16:01:00	7.1	108	2.30	16.64
145	16:02:00	6.9	106	2.29	16.65
145	16:03:00	7.1	107	2.29	16.60
145	16:04:00	6.7	109	2.28	16.61
145	16:05:00	6.6	110	2.26	16.62
145	16:06:00	6.6	110	2.26	16.62
145	16:07:00	6.8	107	2.26	16.62
145	16:08:00	7.0	106	2.25	16.62
145	16:09:00	7.1	104	2.25	16.61
145	16:10:00	7.1	106	2.25	16.60
145	16:11:00	7.0	113	2.28	16.57
145	16:12:00	6.9	115	2.28	16.54
145	16:13:00	6.7	116	2.27	16.54
145	16:14:00	6.6	116	2.26	16.55
145	16:15:00	6.8	118	2.25	16.56
145	16:16:00	6.9	119	2.23	16.60
145	16:17:00	6.9	112	2.20	16.67
145	16:18:00	6.8	111	2.21	16.64
145	16:19:00	6.6	109	2.21	16.63
145	16:20:00	6.5	108	2.20	16.65
145	16:21:00	6.5	106	2.20	16.65
145	16:22:00	6.2	104	2.20	16.66
145	16:23:00	6.3	104	2.19	16.66
145	16:24:00	6.4	104	2.19	16.67
145	16:25:00	6.7	104	2.20	16.67
145	16:26:00	6.5	106	2.19	16.67
145	16:27:00	6.4	108	2.19	16.67
145	16:28:00	6.5	111	2.18	16.66
145	16:29:00	6.6	110	2.17	16.70
145	16:30:00	6.4	108	2.17	16.68
145	16:31:00	6.5	107	2.18	16.67
145	16:32:00	6.7	106	2.18	16.64
145	16:33:00	6.7	106	2.20	16.61

Interpoll Laboratories, Inc.
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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM92
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test NO. 9 - Electrics OFF

No. 12 Pelletizer Waste Gas Inlet -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	16:34:00	7.1	106	2.19	16.61
145	16:35:00	7.1	105	2.21	16.60
145	16:36:00	6.7	107	2.21	16.59
145	16:37:00	6.8	108	2.22	16.56
145	16:38:00	6.8	106	2.19	16.62
145	16:39:00	6.7	106	2.20	16.61
145	16:40:00	7.3	105	2.21	16.60
145	16:41:00	7.5	110	2.21	16.59
145	16:42:00	7.4	111	2.21	16.61
145	16:43:00	7.3	111	2.20	16.63
145	16:44:00	7.0	110	2.19	16.64
145	16:45:00	6.7	110	2.20	16.64
145	16:46:00	6.7	109	2.19	16.63
145	16:47:00	6.7	106	2.19	16.62
145	16:48:00	6.5	103	2.18	16.63
145	16:49:00	6.2	102	2.18	16.64
145	16:50:00	6.0	110	2.21	16.58
145	16:51:00	6.1	114	2.22	16.55
145	16:52:00	6.0	116	2.22	16.55
145	16:53:00	6.2	117	2.20	16.59
145	16:54:00	6.2	116	2.22	16.56
145	16:55:00	6.3	112	2.20	16.58
145	16:56:00	6.4	110	2.21	16.59
145	16:57:00	6.8	108	2.19	16.60
145	16:58:00	6.8	108	2.23	16.61
Run Average		6.7	109	2.22	16.62

Interpoll Laboratories, Inc.
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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM93
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 9 - Electrics OFF

No. 12 Pelletizer Waste Gas Inlet -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	17:26:00	5.1	105	2.16	16.57
145	17:27:00	5.1	105	2.15	16.59
145	17:28:00	4.9	105	2.15	16.60
145	17:29:00	4.7	107	2.15	16.60
145	17:30:00	4.6	109	2.14	16.62
145	17:31:00	4.8	110	2.14	16.62
145	17:32:00	4.8	106	2.14	16.63
145	17:33:00	4.9	103	2.14	16.60
145	17:34:00	4.9	101	2.14	16.63
145	17:35:00	4.6	102	2.15	16.61
145	17:36:00	4.4	101	2.15	16.61
145	17:37:00	4.2	104	2.16	16.61
145	17:38:00	4.0	110	2.17	16.58
145	17:39:00	4.0	112	2.18	16.59
145	17:40:00	3.9	115	2.18	16.60
145	17:41:00	3.8	116	2.18	16.58
145	17:42:00	3.6	114	2.17	16.59
145	17:43:00	3.4	109	2.15	16.63
145	17:44:00	3.6	107	2.14	16.65
145	17:45:00	3.7	105	2.14	16.65
145	17:46:00	3.7	104	2.15	16.63
145	17:47:00	3.8	102	2.15	16.63
145	17:48:00	3.8	102	2.16	16.62
145	17:49:00	3.8	103	2.16	16.62
145	17:50:00	3.9	105	2.17	16.60
145	17:51:00	3.6	108	2.18	16.58
145	17:52:00	3.4	107	2.17	16.59
145	17:53:00	3.2	105	2.16	16.64
145	17:54:00	2.8	106	2.16	16.63
145	17:55:00	2.5	108	2.16	16.62
145	17:56:00	2.4	108	2.14	16.64
145	17:57:00	2.3	107	2.13	16.69
145	17:58:00	2.4	106	2.14	16.67
145	17:59:00	2.7	105	2.15	16.63

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM93
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 9 - Electrics OFF

No. 12 Pelletizer Waste Gas Inlet -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	18:00:00	2.8	105	2.16	16.62
145	18:01:00	2.9	105	2.17	16.59
145	18:02:00	3.0	104	2.16	16.58
145	18:03:00	3.1	106	2.17	16.57
145	18:04:00	3.1	106	2.17	16.57
145	18:05:00	3.3	105	2.17	16.58
145	18:06:00	3.3	103	2.16	16.59
145	18:07:00	3.3	104	2.16	16.62
145	18:08:00	3.1	107	2.17	16.62
145	18:09:00	3.0	115	2.20	16.56
145	18:10:00	2.9	114	2.19	16.56
145	18:11:00	2.6	114	2.19	16.59
145	18:12:00	2.5	114	2.18	16.58
145	18:13:00	2.6	116	2.19	16.58
145	18:14:00	2.5	115	2.17	16.60
145	18:15:00	2.7	110	2.16	16.63
145	18:16:00	2.6	108	2.16	16.62
145	18:17:00	2.7	107	2.17	16.61
145	18:18:00	2.8	105	2.17	16.59
145	18:19:00	2.9	103	2.18	16.57
145	18:20:00	2.9	101	2.16	16.60
145	18:21:00	2.9	103	2.17	16.58
145	18:22:00	2.9	103	2.17	16.58
145	18:23:00	2.9	106	2.17	16.60
145	18:24:00	2.9	108	2.16	16.62
Run Average		3.4	107	2.16	16.61

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM101
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test NO. 10 - Electrics ON

No. 12 Pelletizer Waste Gas Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	09:29:00	1.7	103	1.83	16.77
145	09:30:00	1.7	104	1.84	16.75
145	09:31:00	1.8	106	1.84	16.75
145	09:32:00	1.6	104	1.83	16.78
145	09:33:00	1.7	104	1.83	16.77
145	09:34:00	1.7	105	1.82	16.79
145	09:35:00	1.5	106	1.84	16.77
145	09:36:00	1.7	107	1.85	16.75
145	09:37:00	1.5	107	1.85	16.74
145	09:38:00	1.5	108	1.86	16.72
145	09:39:00	1.3	108	1.86	16.70
145	09:40:00	1.5	109	1.86	16.71
145	09:41:00	1.3	109	1.86	16.71
145	09:42:00	1.5	110	1.86	16.73
145	09:43:00	1.3	110	1.85	16.73
145	09:44:00	1.4	110	1.85	16.74
145	09:45:00	1.6	111	1.86	16.71
145	09:46:00	1.6	109	1.86	16.71
145	09:47:00	1.5	107	1.85	16.74
145	09:48:00	1.5	104	1.85	16.74
145	09:49:00	1.5	103	1.86	16.72
145	09:50:00	1.7	104	1.86	16.70
145	09:51:00	1.7	107	1.86	16.72
145	09:52:00	1.6	108	1.85	16.75
145	09:53:00	1.4	112	1.86	16.71
145	09:54:00	1.4	111	1.86	16.70
145	09:55:00	1.4	110	1.86	16.70
145	09:56:00	1.4	107	1.85	16.74
145	09:57:00	1.3	107	1.85	16.75
145	09:58:00	1.4	109	1.86	16.72
145	09:59:00	1.3	110	1.87	16.71
145	10:00:00	1.6	109	1.87	16.71
145	10:01:00	1.6	109	1.86	16.72
145	10:02:00	1.4	109	1.85	16.76

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM101
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 10. - Electrics ON

No. 12 Pelletizer Waste Gas Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	10:03:00	1.3	111	1.85	16.77
145	10:04:00	1.5	107	38.00	16.79
145	10:05:00	1.6	106	1.84	16.76
145	10:06:00	1.6	106	1.86	16.75
145	10:07:00	1.3	107	1.86	16.72
145	10:08:00	1.7	106	1.86	16.72
145	10:09:00	1.5	105	1.84	16.75
145	10:10:00	1.6	106	1.85	16.74
145	10:11:00	1.6	105	1.84	16.77
145	10:12:00	1.5	106	1.84	16.79
145	10:13:00	1.4	107	1.84	16.77
145	10:14:00	1.3	108	1.83	16.80
145	10:15:00	1.4	108	1.83	16.80
145	10:16:00	1.3	108	1.84	16.80
145	10:17:00	1.5	108	1.85	16.76
145	10:18:00	1.4	108	1.86	16.74
145	10:19:00	1.5	108	1.87	16.71
145	10:20:00	1.8	108	1.87	16.71
145	10:21:00	1.9	110	1.87	16.71
145	10:22:00	1.8	112	1.87	16.70
145	10:23:00	1.6	112	1.88	16.70
145	10:24:00	1.7	111	1.88	16.69
145	10:25:00	1.6	109	1.87	16.71
145	10:26:00	1.5	108	1.87	16.72
145	10:27:00	1.5	109	1.88	16.70
Run Average		1.5	108	2.47	16.74

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM102
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 10 - Electrics ON

No. 12 Pelletizer Waste Gas Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		*SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	11:14:00	-1.3	104	1.87	16.75
145	11:15:00	-1.1	108	1.87	16.77
145	11:16:00	-1.2	113	1.89	16.73
145	11:17:00	-1.2	116	1.90	16.72
145	11:18:00	-1.1	117	1.88	16.76
145	11:19:00	-1.1	116	1.88	16.79
145	11:20:00	-1.0	110	1.86	16.79
145	11:21:00	-1.1	108	1.86	16.79
145	11:22:00	-1.1	108	1.86	16.79
145	11:23:00	-1.3	108	1.85	16.80
145	11:24:00	-1.0	106	1.84	16.82
145	11:25:00	-1.1	104	1.84	16.81
145	11:26:00	-1.1	102	1.83	16.82
145	11:27:00	-1.2	101	1.83	16.84
145	11:28:00	-1.2	102	1.84	16.81
145	11:29:00	-1.1	103	1.85	16.78
145	11:30:00	-1.3	104	1.86	16.76
145	11:31:00	-1.3	107	1.86	16.76
145	11:32:00	-1.3	106	1.86	16.76
145	11:33:00	-1.2	108	1.86	16.79
145	11:34:00	-1.4	110	1.89	16.71
145	11:35:00	-1.2	110	1.89	16.71
145	11:36:00	-1.4	110	1.88	16.74
145	11:37:00	-1.3	109	1.88	16.73
145	11:38:00	-1.3	108	1.89	16.71
145	11:39:00	-1.2	108	1.90	16.69
145	11:40:00	-1.5	107	1.89	16.70
145	11:41:00	-1.3	103	1.88	16.73
145	11:42:00	-1.4	102	1.88	16.72
145	11:43:00	-1.4	108	1.89	16.72
145	11:44:00	-1.3	118	1.89	16.72
145	11:45:00	-1.3	118	1.89	16.74
145	11:46:00	-1.5	117	1.89	16.74
145	11:47:00	-1.3	113	1.88	16.75

* Please Note: SO2 values are not negative, they are below detection limit.

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM102
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 10 - Electrics ON

No. 12 Pelletizer Waste Gas Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		*SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	11:48:00	-1.3	108	1.87	16.75
145	11:49:00	-1.1	108	1.86	16.77
145	11:50:00	-1.2	107	1.86	16.79
145	11:51:00	-1.3	107	1.86	16.77
145	11:52:00	-1.2	107	1.87	16.76
145	11:53:00	-1.1	108	1.88	16.74
145	11:54:00	-1.2	107	1.87	16.76
145	11:55:00	-1.2	110	1.86	16.78
145	11:56:00	-1.1	109	1.86	16.81
145	11:57:00	-1.0	108	1.86	16.78
145	11:58:00	-1.1	105	1.85	16.82
145	11:59:00	-1.1	104	1.85	16.83
145	12:00:00	-1.1	104	1.85	16.80
145	12:01:00	-1.3	107	1.85	16.81
145	12:02:00	-1.3	107	1.85	16.83
145	12:03:00	-1.2	107	1.84	16.85
145	12:04:00	-1.2	106	1.84	16.85
145	12:05:00	-1.2	106	1.85	16.82
145	12:06:00	-1.2	101	1.84	16.82
145	12:07:00	-1.2	102	1.85	16.81
145	12:08:00	-1.2	109	1.87	16.76
145	12:09:00	-1.5	112	1.89	16.71
145	12:10:00	-1.4	113	1.90	16.66
145	12:11:00	-1.3	111	1.89	16.71
145	12:12:00	-1.3	114	1.90	16.68
Run Average		-1.2	108	1.87	16.77

* Please Note: SO2 Values are not negative, they are below detection limit.

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM001
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 10 - Electrics ON

No. 12 Pelletizer Waste Gas Stack -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		* SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	12:59:00	-0.2	101	1.99	16.70
145	13:00:00	-0.1	101	1.99	16.71
145	13:01:00	-0.2	102	1.99	16.71
145	13:02:00	-0.2	103	1.99	16.74
145	13:03:00	-0.2	103	1.98	16.73
145	13:04:00	-0.2	103	1.98	16.74
145	13:05:00	-0.2	102	1.98	16.74
145	13:06:00	-0.2	101	1.97	16.77
145	13:07:00	-0.3	103	1.98	16.73
145	13:08:00	-0.3	105	1.99	16.69
145	13:09:00	-0.3	106	2.00	16.65
145	13:10:00	-0.3	105	1.99	16.67
145	13:11:00	-0.3	104	2.00	16.65
145	13:12:00	-0.3	102	2.01	16.62
145	13:13:00	-0.3	100	2.02	16.62
145	13:14:00	-0.3	99.8	2.02	16.61
145	13:15:00	-0.3	101	2.01	16.62
145	13:16:00	-0.3	104	2.02	16.62
145	13:17:00	-0.4	111	2.03	16.64
145	13:18:00	-0.3	113	2.02	16.64
145	13:19:00	-0.4	115	2.03	16.63
145	13:20:00	-0.2	117	2.04	16.61
145	13:21:00	-0.3	115	2.05	16.57
145	13:22:00	-0.4	106	2.02	16.60
145	13:23:00	-0.6	104	2.04	16.56
145	13:24:00	-0.1	105	2.06	16.52
145	13:25:00	-0.5	104	2.04	16.58
145	13:26:00	-0.5	108	2.04	16.58
145	13:27:00	-0.3	110	2.03	16.61
145	13:28:00	-0.4	107	2.02	16.62
145	13:29:00	-0.6	103	2.01	16.65
145	13:30:00	-0.7	103	2.01	16.64
145	13:31:00	-0.6	103	2.03	16.60
145	13:32:00	-0.7	103	2.03	16.57

* Please Note: SO2 values are not negative, they are below detection limit.

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM121
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 12- Electrics OFF

No. 12 Pelletizer Waste Gas Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		* SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	14:34:00	0.0	105	1.89	16.70
145	14:35:00	-0.1	103	1.90	16.69
145	14:36:00	-0.1	98.6	1.89	16.71
145	14:37:00	-0.1	96.6	1.89	16.69
145	14:38:00	-0.0	103	1.93	16.61
145	14:39:00	-0.1	107	1.93	16.63
145	14:40:00	-0.2	110	1.93	16.65
145	14:41:00	-0.2	113	1.93	16.64
145	14:42:00	-0.2	116	1.93	16.64
145	14:43:00	-0.2	118	1.93	16.64
145	14:44:00	-0.2	116	1.92	16.65
145	14:45:00	-0.1	109	1.90	16.67
145	14:46:00	-0.2	105	1.91	16.66
145	14:47:00	-0.2	101	1.91	16.67
145	14:48:00	-0.2	98.9	1.91	16.64
145	14:49:00	-0.2	101	1.91	16.65
145	14:50:00	-0.1	105	1.90	16.68
145	14:51:00	-0.1	105	1.90	16.69
145	14:52:00	-0.2	106	1.90	16.70
145	14:53:00	-0.2	105	1.91	16.68
145	14:54:00	-0.1	104	1.91	16.67
145	14:55:00	-0.2	103	1.91	16.69
145	14:56:00	-0.2	104	1.90	16.71
145	14:57:00	-0.3	105	1.91	16.70
145	14:58:00	-0.2	106	1.90	16.71
145	14:59:00	-0.3	106	1.90	16.71
145	15:00:00	0.0	108	1.92	16.65
145	15:01:00	-0.1	108	1.91	16.66
145	15:02:00	-0.2	107	1.90	16.69
145	15:03:00	-0.1	104	1.90	16.70
145	15:04:00	0.0	100	1.89	16.70
145	15:05:00	-0.1	99.8	1.89	16.73
145	15:06:00	-0.2	101	1.88	16.73
145	15:07:00	-0.1	102	1.88	16.74

* Please Note: SO2 Values are not negative, they are below detection limit.

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM122
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 12- Electrics OFF

No. 12 Pelletizer Waste Gas Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		*SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	16:00:00	-0.1	106	1.90	16.69
145	16:01:00	-0.2	102	1.90	16.71
145	16:02:00	-0.2	101	1.91	16.69
145	16:03:00	-0.2	103	1.91	16.67
145	16:04:00	-0.1	105	1.91	16.68
145	16:05:00	-0.2	106	1.91	16.68
145	16:06:00	-0.1	104	1.91	16.67
145	16:07:00	-0.2	102	1.90	16.68
145	16:08:00	-0.1	101	1.91	16.67
145	16:09:00	-0.2	100	1.91	16.68
145	16:10:00	-0.2	102	1.91	16.67
145	16:11:00	-0.3	110	1.94	16.62
145	16:12:00	-0.3	110	1.94	16.62
145	16:13:00	-0.3	110	1.93	16.61
145	16:14:00	-0.2	113	1.93	16.62
145	16:15:00	-0.3	114	1.92	16.65
145	16:16:00	-0.4	112	1.90	16.70
145	16:17:00	-0.4	107	1.88	16.74
145	16:18:00	-0.3	106	1.90	16.70
145	16:19:00	-0.2	104	1.89	16.71
145	16:20:00	-0.2	102	1.89	16.72
145	16:21:00	-0.2	101	1.88	16.73
145	16:22:00	-0.3	99.2	1.88	16.73
145	16:23:00	-0.3	99.9	1.89	16.74
145	16:24:00	-0.2	99.5	1.88	16.74
145	16:25:00	-0.1	100	1.89	16.74
145	16:26:00	-0.3	102	1.88	16.75
145	16:27:00	-0.2	105	1.89	16.73
145	16:28:00	-0.3	106	1.88	16.75
145	16:29:00	-0.3	105	1.87	16.77
145	16:30:00	-0.2	103	1.88	16.76
145	16:31:00	-0.3	102	1.88	16.74
145	16:32:00	-0.3	100	1.89	16.72
145	16:33:00	-0.3	101	1.90	16.69

* Please Note: SO2 values are not negative, they are below detection limit.

Interpoll Laboratories, Inc.
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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM123
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 12- Electrics OFF

No. 12 Pelletizer Waste Gas Stack -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		*SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
145	17:27:00	-0.3	102	1.90	16.70
145	17:28:00	-0.2	102	1.89	16.71
145	17:29:00	-0.2	104	1.89	16.72
145	17:30:00	-0.2	106	1.88	16.74
145	17:31:00	-0.2	104	1.88	16.74
145	17:32:00	-0.2	102	1.88	16.73
145	17:33:00	-0.3	97.9	1.88	16.73
145	17:34:00	-0.3	96.8	1.89	16.73
145	17:35:00	-0.3	97.4	1.89	16.72
145	17:36:00	-0.3	97.2	1.89	16.73
145	17:37:00	-0.2	104	1.91	16.70
145	17:38:00	-0.3	106	1.91	16.71
145	17:39:00	-0.4	109	1.91	16.71
145	17:40:00	-0.3	112	1.92	16.68
145	17:41:00	-0.3	112	1.91	16.70
145	17:42:00	-0.3	107	1.90	16.70
145	17:43:00	-0.2	103	1.88	16.75
145	17:44:00	-0.3	102	1.88	16.76
145	17:45:00	-0.2	99.8	1.88	16.76
145	17:46:00	-0.2	98.7	1.89	16.73
145	17:47:00	-0.2	97.7	1.89	16.71
145	17:48:00	-0.1	97.2	1.89	16.71
145	17:49:00	-0.2	99.0	1.90	16.71
145	17:50:00	-0.3	102	1.91	16.69
145	17:51:00	-0.2	104	1.92	16.67
145	17:52:00	-0.2	102	1.90	16.71
145	17:53:00	-0.0	101	1.90	16.73
145	17:54:00	0.0	103	1.90	16.72
145	17:55:00	-0.0	105	1.90	16.73
145	17:56:00	0.1	104	1.88	16.75
145	17:57:00	-0.2	102	1.88	16.79
145	17:58:00	-0.2	102	1.89	16.73
145	17:59:00	0.1	101	1.89	16.72
145	18:00:00	0.0	100	1.90	16.70

* Please Note: SO2 values are not negative, they are below detection limit.

Interpoll Laboratories, Inc.
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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM151
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 15 - Electrics ON

No. 11 Pelletizer Waste Gas Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		*SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
146	08:14:00	-6.7	71.7	1.35	17.92
146	08:15:00	-6.4	72.6	1.35	17.87
146	08:16:00	-5.6	72.4	1.35	17.87
146	08:17:00	-5.7	71.6	1.35	17.85
146	08:18:00	-5.8	66.1	1.35	17.83
146	08:19:00	-6.0	65.0	1.36	17.80
146	08:20:00	-5.3	63.5	1.38	17.75
146	08:21:00	-5.2	67.8	1.42	17.66
146	08:22:00	-5.0	73.2	1.46	17.58
146	08:23:00	-5.1	78.6	1.49	17.52
146	08:24:00	-5.1	89.0	1.51	17.49
146	08:25:00	-4.9	87.5	1.50	17.51
146	08:26:00	-4.6	82.1	1.50	17.49
146	08:27:00	-4.9	75.4	1.49	17.50
146	08:28:00	-4.8	68.6	1.50	17.47
146	08:29:00	-4.9	65.7	1.52	17.42
146	08:30:00	-4.6	65.1	1.55	17.35
146	08:31:00	-4.7	68.4	1.58	17.29
146	08:32:00	-4.9	75.6	1.59	17.29
146	08:33:00	-4.7	83.3	1.59	17.29
146	08:34:00	-4.4	84.9	1.57	17.34
146	08:35:00	-4.5	77.3	1.53	17.38
146	08:36:00	-5.2	30.6	0.45	20.06
146	08:37:00	-4.3	83.6	1.61	17.24
146	08:38:00	-4.1	83.5	1.61	17.24
146	08:39:00	-4.2	82.2	1.63	17.21
146	08:40:00	-4.5	84.4	1.65	17.18
146	08:41:00	-4.5	86.9	1.67	17.14
146	08:42:00	-4.5	91.0	1.66	17.15
146	08:43:00	-4.3	93.7	1.66	17.16
146	08:44:00	-4.3	93.5	1.64	17.19
146	08:45:00	-4.5	94.8	1.62	17.22
146	08:46:00	-4.7	96.8	1.62	17.21
146	08:47:00	-4.5	95.1	1.61	17.24

* Please Note: SO2 values are not negative, they are below detection limit.

Interpoll Laboratories, Inc.
(612) 786-6020

Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM152
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 15 - Electrics ON

No. 11 Pelletizer Waste Gas Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		*SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
146	09:59:00	-1.9	85.4	1.67	17.11
146	10:00:00	-2.3	86.2	1.67	17.11
146	10:01:00	-2.7	87.9	1.66	17.12
146	10:02:00	-2.9	89.5	1.67	17.12
146	10:03:00	-3.5	90.7	1.67	17.11
146	10:04:00	-4.4	90.1	1.67	17.10
146	10:05:00	-4.0	85.3	1.67	17.09
146	10:06:00	-3.6	85.1	1.68	17.08
146	10:07:00	-3.9	80.5	1.68	17.07
146	10:08:00	-4.1	87.1	1.68	17.09
146	10:09:00	-5.0	91.3	1.68	17.10
146	10:10:00	-7.2	92.0	1.68	17.10
146	10:11:00	-8.5	93.3	1.68	17.11
146	10:12:00	-7.2	88.8	1.66	17.15
146	10:13:00	-4.7	85.0	1.64	17.18
146	10:14:00	-0.2	83.8	1.64	17.18
146	10:15:00	-0.4	83.1	1.64	17.19
146	10:16:00	-1.2	83.6	1.65	17.17
146	10:17:00	-1.5	84.4	1.67	17.11
146	10:18:00	-1.4	85.9	1.69	17.08
146	10:19:00	-2.0	86.0	1.68	17.09
146	10:20:00	-2.8	90.7	1.68	17.10
146	10:21:00	-4.7	91.8	1.68	17.11
146	10:22:00	-5.2	89.0	1.68	17.12
146	10:23:00	-5.3	85.2	1.68	17.12
146	10:24:00	-4.7	81.6	1.66	17.15
146	10:25:00	-4.5	86.3	1.66	17.17
146	10:26:00	-3.1	89.4	1.67	17.16
146	10:27:00	-2.7	89.7	1.66	17.18
146	10:28:00	-1.2	85.1	1.65	17.18
146	10:29:00	-0.6	83.2	1.65	17.19
146	10:30:00	-1.2	82.2	1.65	17.18
146	10:31:00	-0.9	80.4	1.62	17.24
146	10:32:00	-0.8	79.2	1.62	17.24

* Please Note: SO2 values are not negative, they are below detection limit.

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM153
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 15 - Electrics ON

No. 11 Pelletizer Waste Gas Stack -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
146	11:44:00	3.1	93.6	1.67	17.24
146	11:45:00	3.2	92.1	1.67	17.23
146	11:46:00	3.2	90.4	1.66	17.22
146	11:47:00	2.8	89.2	1.66	17.23
146	11:48:00	2.8	90.4	1.68	17.19
146	11:49:00	2.9	89.2	1.69	17.17
146	11:50:00	2.8	87.4	1.68	17.18
146	11:51:00	2.7	86.7	1.68	17.17
146	11:52:00	2.8	88.2	1.70	17.15
146	11:53:00	2.8	90.8	1.71	17.11
146	11:54:00	3.2	93.8	1.72	17.09
146	11:55:00	3.1	97.0	1.70	17.13
146	11:56:00	3.4	92.9	1.70	17.15
146	11:57:00	3.6	92.0	1.69	17.17
146	11:58:00	3.5	93.1	1.69	17.18
146	11:59:00	3.5	93.2	1.69	17.16
146	12:00:00	3.0	88.0	1.67	17.20
146	12:01:00	3.1	82.8	1.66	17.23
146	12:02:00	3.1	87.1	1.66	17.22
146	12:03:00	2.9	88.1	1.66	17.21
146	12:04:00	2.9	89.2	1.68	17.17
146	12:05:00	2.7	85.4	1.70	17.11
146	12:06:00	2.6	87.6	1.71	17.10
146	12:07:00	2.7	90.9	1.71	17.11
146	12:08:00	2.8	91.7	1.71	17.11
146	12:09:00	3.1	94.4	1.69	17.14
146	12:10:00	3.0	96.9	1.68	17.19
146	12:11:00	3.0	94.7	1.67	17.21
146	12:12:00	2.7	66.3	1.37	17.59
146	12:13:00	2.4	73.1	1.29	18.46
146	12:14:00	3.1	86.9	1.65	17.23
146	12:15:00	3.1	88.3	1.66	17.22
146	12:16:00	2.9	89.4	1.66	17.22
146	12:17:00	2.8	92.6	1.70	17.12

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM161
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 16 - Electrics ON

No. 11 Pelletizer Waste Gas Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
146	08:11:00	3.0	65.7	1.36	18.24
146	08:12:00	2.9	61.3	1.34	18.25
146	08:13:00	3.0	63.1	1.38	18.15
146	08:14:00	2.8	66.4	1.42	18.02
146	08:15:00	2.7	67.9	1.43	17.96
146	08:16:00	2.7	67.5	1.42	17.95
146	08:17:00	2.8	67.5	1.42	17.94
146	08:18:00	2.6	61.9	1.42	17.92
146	08:19:00	2.8	60.4	1.43	17.89
146	08:20:00	3.0	59.0	1.45	17.84
146	08:21:00	2.8	61.8	1.50	17.77
146	08:22:00	2.5	66.8	1.55	17.68
146	08:23:00	2.7	71.2	1.58	17.62
146	08:24:00	2.7	80.4	1.60	17.58
146	08:25:00	2.7	81.8	1.59	17.60
146	08:26:00	2.8	76.1	1.59	17.59
146	08:27:00	2.7	70.8	1.59	17.58
146	08:28:00	2.9	63.5	1.59	17.56
146	08:29:00	2.7	60.7	1.62	17.51
146	08:30:00	2.6	59.6	1.65	17.47
146	08:31:00	2.6	61.7	1.68	17.40
146	08:32:00	2.6	67.8	1.64	17.39
146	08:33:00	2.8	53.8	1.27	18.51
146	08:34:00	3.1	83.6	1.77	17.19
146	08:35:00	3.2	84.8	1.77	17.21
146	08:36:00	3.2	82.4	1.76	17.23
146	08:37:00	3.5	79.3	1.77	17.23
146	08:38:00	3.6	78.5	1.76	17.25
146	08:39:00	3.8	77.9	1.78	17.23
146	08:40:00	4.0	78.4	1.80	17.20
146	08:41:00	4.3	81.3	1.82	17.14
146	08:42:00	4.3	84.7	1.82	17.15
146	08:43:00	4.2	87.4	1.82	17.16
146	08:44:00	4.2	87.5	1.80	17.19

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM162
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 16 - Electrics ON

No. 11 Pelletizer Waste Gas Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
146	09:56:00	4.4	90.2	1.84	17.10
146	09:57:00	4.5	87.5	1.84	17.08
146	09:58:00	4.5	86.4	1.84	17.09
146	09:59:00	4.5	86.2	1.84	17.08
146	10:00:00	4.5	86.4	1.84	17.09
146	10:01:00	4.4	88.4	1.84	17.09
146	10:02:00	4.4	89.4	1.84	17.09
146	10:03:00	4.3	91.5	1.84	17.08
146	10:04:00	4.3	91.1	1.84	17.07
146	10:05:00	4.3	86.5	1.84	17.06
146	10:06:00	4.3	86.0	1.85	17.06
146	10:07:00	4.3	82.1	1.85	17.04
146	10:08:00	4.3	86.5	1.84	17.06
146	10:09:00	4.2	90.9	1.85	17.08
146	10:10:00	4.2	92.4	1.84	17.07
146	10:11:00	4.2	93.4	1.84	17.08
146	10:12:00	4.1	90.0	1.82	17.11
146	10:13:00	4.0	86.0	1.80	17.14
146	10:14:00	4.2	85.0	1.80	17.15
146	10:15:00	4.2	84.0	1.80	17.15
146	10:16:00	4.1	84.1	1.80	17.16
146	10:17:00	4.2	85.1	1.83	17.08
146	10:18:00	4.1	86.4	1.85	17.06
146	10:19:00	4.2	86.2	1.85	17.06
146	10:20:00	4.2	90.2	1.85	17.07
146	10:21:00	4.2	92.0	1.85	17.07
146	10:22:00	4.3	90.4	1.84	17.09
146	10:23:00	4.3	85.8	1.84	17.09
146	10:24:00	4.4	83.0	1.82	17.12
146	10:25:00	4.4	85.8	1.82	17.13
146	10:26:00	4.4	89.8	1.83	17.13
146	10:27:00	4.5	90.4	1.81	17.15
146	10:28:00	4.5	86.5	1.81	17.15
146	10:29:00	4.4	84.4	1.80	17.16

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Printout of ESC Model 80 DAS
for CEM Trailer No. 2
- 1994 -

File Name: CNM163
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 16 - Electrics ON

No. 11 Pelletizer Waste Gas Stack -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
146	11:41:00	2.2	81.0	1.86	17.16
146	11:42:00	2.1	82.7	1.86	17.15
146	11:43:00	2.1	87.8	1.86	17.16
146	11:44:00	2.2	90.5	1.86	17.16
146	11:45:00	2.3	89.7	1.86	17.16
146	11:46:00	2.2	87.6	1.86	17.15
146	11:47:00	2.2	87.1	1.85	17.14
146	11:48:00	2.2	87.2	1.87	17.13
146	11:49:00	2.2	86.8	1.88	17.09
146	11:50:00	2.0	85.1	1.87	17.09
146	11:51:00	1.9	84.2	1.87	17.09
146	11:52:00	2.1	84.9	1.89	17.07
146	11:53:00	2.0	87.5	1.91	17.03
146	11:54:00	2.0	89.8	1.91	17.01
146	11:55:00	2.0	93.2	1.89	17.04
146	11:56:00	2.0	90.0	1.88	17.07
146	11:57:00	2.1	89.0	1.87	17.07
146	11:58:00	2.1	89.6	1.87	17.10
146	11:59:00	2.0	90.0	1.88	17.08
146	12:00:00	2.2	86.4	1.86	17.11
146	12:01:00	2.2	80.2	1.84	17.14
146	12:02:00	2.2	83.8	1.85	17.13
146	12:03:00	2.1	84.7	1.85	17.13
146	12:04:00	2.1	86.0	1.87	17.09
146	12:05:00	2.2	82.5	1.90	17.03
146	12:06:00	2.2	83.9	1.90	17.01
146	12:07:00	2.0	87.1	1.90	17.02
146	12:08:00	2.1	88.1	1.90	17.01
146	12:09:00	2.1	89.8	1.88	17.05
146	12:10:00	2.1	92.6	1.86	17.09
146	12:11:00	2.1	91.1	1.86	17.12
146	12:12:00	2.1	87.1	1.85	17.10
146	12:13:00	2.3	83.7	1.84	17.14
146	12:14:00	2.3	83.1	1.83	17.15

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM231
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 23

No. 2 Boiler Stack -- Run 1

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
147	08:43:00	182	344	12.92	8.72
147	08:44:00	184	343	12.97	8.69
147	08:45:00	188	342	12.97	8.69
147	08:46:00	191	341	12.96	8.70
147	08:47:00	196	343	12.90	8.76
147	08:48:00	200	344	12.96	8.72
147	08:49:00	201	344	12.98	8.71
147	08:50:00	200	343	12.94	8.75
147	08:51:00	203	343	13.00	8.72
147	08:52:00	202	344	13.04	8.70
147	08:53:00	193	343	13.01	8.76
147	08:54:00	190	340	12.90	8.78
147	08:55:00	205	344	13.05	8.70
147	08:56:00	204	345	12.98	8.75
147	08:57:00	203	346	12.97	8.77
147	08:58:00	205	345	13.05	8.72
147	08:59:00	206	345	13.01	8.75
147	09:00:00	208	342	13.10	8.69
147	09:01:00	207	344	13.08	8.70
147	09:02:00	207	345	13.05	8.74
147	09:03:00	206	343	12.99	8.79
147	09:04:00	208	344	13.06	8.73
147	09:05:00	208	342	13.05	8.76
147	09:06:00	203	341	13.19	8.68
147	09:07:00	192	336	13.06	8.75
147	09:08:00	190	330	13.07	8.81
147	09:09:00	189	325	13.09	9.04
147	09:10:00	191	322	12.95	9.30
147	09:11:00	209	342	13.13	8.73
147	09:12:00	208	342	13.10	8.74
147	09:13:00	208	342	13.15	8.73
147	09:14:00	212	343	13.25	8.64
147	09:15:00	212	344	13.31	8.60
147	09:16:00	210	346	13.29	8.61

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM232
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota
Test No. 23

No. 2 Boiler Stack -- Run 2

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
147	10:03:00	211	313	10.96	8.69
147	10:04:00	210	313	11.02	8.62
147	10:05:00	210	311	10.92	8.74
147	10:06:00	211	312	10.96	8.69
147	10:07:00	209	311	10.91	8.74
147	10:08:00	209	315	10.97	8.69
147	10:09:00	208	312	10.91	8.76
147	10:10:00	211	312	11.04	8.66
147	10:11:00	212	311	11.07	8.61
147	10:12:00	208	309	10.86	8.81
147	10:13:00	208	312	10.89	8.82
147	10:14:00	210	312	10.92	8.75
147	10:15:00	231	311	10.98	8.72
147	10:16:00	228	310	10.98	8.70
147	10:17:00	237	307	10.90	8.79
147	10:18:00	250	306	10.78	8.92
147	10:19:00	230	306	10.62	9.13
147	10:20:00	240	305	10.50	9.29
147	10:21:00	216	306	10.46	9.34
147	10:22:00	206	309	10.46	9.35
147	10:23:00	215	308	10.55	9.25
147	10:24:00	214	308	10.58	9.20
147	10:25:00	208	307	10.59	9.20
147	10:26:00	203	307	10.59	9.20
147	10:27:00	201	308	10.64	9.14
147	10:28:00	200	308	10.65	9.13
147	10:29:00	203	308	10.65	9.13
147	10:30:00	203	308	10.66	9.13
147	10:31:00	202	308	10.68	9.10
147	10:32:00	202	309	10.67	9.11
147	10:33:00	200	311	10.66	9.13
147	10:34:00	199	314	10.64	9.15
147	10:35:00	200	314	10.69	9.10
147	10:36:00	199	309	10.68	9.11

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Printout of ESC Model 80 DAS
for CEM Trailer No. 1
- 1994 -

File Name: CNM233
Job Number: 4-2971
Client: Cyprus Northshore Mining
Location: Silver Bay, Minnesota

Test No. 23

No. 2 Boiler Stack -- Run 3

Julian Date	Time (Hrs)	Conc. (dry basis unless noted)			
		SO2 (ppmv)	NOx (ppmv)	CO2 (%v/v)	O2 (%v/v)
147	11:18:00	203	311	10.48	9.12
147	11:19:00	204	309	10.50	9.10
147	11:20:00	202	310	10.48	9.12
147	11:21:00	201	310	10.50	9.11
147	11:22:00	204	309	10.57	9.02
147	11:23:00	204	309	10.55	9.05
147	11:24:00	205	309	10.60	8.99
147	11:25:00	205	310	10.56	9.02
147	11:26:00	204	308	10.54	9.08
147	11:27:00	208	309	10.64	8.95
147	11:28:00	206	307	10.62	8.96
147	11:29:00	207	309	10.69	8.89
147	11:30:00	208	309	10.72	8.84
147	11:31:00	205	314	10.55	9.05
147	11:32:00	207	317	10.60	9.01
147	11:33:00	208	315	10.63	8.99
147	11:34:00	208	315	10.69	8.90
147	11:35:00	206	325	10.77	8.82
147	11:36:00	208	336	10.90	8.66
147	11:37:00	210	341	10.94	8.60
147	11:38:00	213	343	11.06	8.52
147	11:39:00	216	343	11.17	8.40
147	11:40:00	214	341	11.09	8.47
147	11:41:00	216	344	11.22	8.36
147	11:42:00	215	342	11.19	8.37
147	11:43:00	215	344	11.17	8.42
147	11:44:00	218	342	11.30	8.28
147	11:45:00	219	342	11.25	8.33
147	11:46:00	219	344	11.29	8.30
147	11:47:00	221	343	11.39	8.21
147	11:48:00	220	341	11.35	8.23
147	11:49:00	217	341	11.25	8.33
147	11:50:00	217	339	11.21	8.36
147	11:51:00	215	338	11.13	8.43

APPENDIX F

MEASUREMENT SYSTEMS PERFORMANCE SPECIFICATIONS

EPA Method 2 Field Data Sheet

Drawing of Test Site

Job Cyprus Northshore Mining
Source No 12 Pelletizer Hood Ex DUCT
Test 1 Run 0 Date 5-24-74
Stack Dimen. 84 x 113 IN.
Dry Bulb _____ °F Wet bulb _____ °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 29.28 IN.HG
Static Pressure _____ IN.WC
Operators B. ASCHENBAUM
Pitot No. 8' INST C₁

Cross-section View	Elevation View

[illegible]

R or nothing = reg. manometer; S = expanded; E = electronic

INTERPOL LABORATORIES, INC.
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EPA Method 2 Field Data Sheet

Drawing of Test Site

Job Cyprus Northshore Mining
Source 1204 WASTE GAS DUCT
Test 8 Run 5 Date 5-25-96
Stack Dimen. 92 x 92 IN.
Dry Bulb °F Wet bulb °F
Manometer ☐ Reg. ☐ Exp ☐ Elec.
Barometric Pressure 29.14 IN.HG
Static Pressure IN.WC
Operators B. Beckenbach
Pitot No. 8' DUST C.

Cross-section View	Elevation View

[illegible]

R or nothing = reg. manometer; S = expanded; E = electronic

Job Cyprus Northshore Mining
Source No 2 Boiler Stack
Test 23 Run 0 Date 5-27-90
Stack dimen. _____ IN.
Dry bulb _____ °F Wet bulb _____ °F
Manometer: ☐ Reg. ☐ Exp. ☐ Elec.
Barometric pressure 29.48 in Hg
Static pressure _____ in WC
Operators B. Aschornbach D. MARSO
Pitot No. Bst DUST C_p

Cross-section View	Elevation View
Drawing of Test site	

2 METER RULE

[illegible]

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NO_x System Bias Check

Job Cyprus Northshore Mining Source No 12 Retriever Hoop Ex
 Test 1 Run 1-6 Date 5-24-94 Site INLET
 Operator Bob

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	0823	Zero Gas	0	1	0	1	250	.40
		Upscale	140.5	141	140	1	250	.40
2	1023	Zero Gas	0	1	1	0	250	0
		Upscale	140.5	141	139	2	250	.80
3	1247	Zero Gas	0	1	2	1	250	.40
		Upscale	140.5	141	138	3	250	1.20
4	1454	Zero Gas	0	1	2	1	250	.40
		Upscale	140.5	141	138	3	250	1.20
5	1623	Zero Gas	0	1	2	1	250	.40
		Upscale	140.5	141	140	1	250	.40
6	1743	Zero Gas	0	1	2	1	250	.40
		Upscale	140.5	141	140	1	250	.40
7	1908	Zero Gas	0	1	2	1	250	.40
		Upscale	140.5	141	141	0	250	0
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC

(612) 786-6020

CO₂ System Bias Check

Job Cyprus Northshore Mining Source Nel 2 Polluter Hood Ex
 Test 1 Run 1-6 Date 5-24-84 Site INLET
 Operator Gas

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	0823	Zero Gas	0	0	.1	.1	20	.50
		Upscale	11.0	11.1	11.0	.1	20	.50
2	1023	Zero Gas	0	0	.1	.1	20	.50
		Upscale	11.0	11.1	11.0	.1	20	.50
3	1247	Zero Gas	0	0	0	0	20	0
		Upscale	11.0	11.1	11.0	.1	20	.50
4	1455	Zero Gas	0	0	.1	.1	20	.50
		Upscale	11.0	11.1	11.1	0	20	0
5	1623	Zero Gas	0	0	0	0	20	0
		Upscale	11.0	11.1	10.9	.2	20	1.00
6	1743	Zero Gas	0	0	.1	.1	20	.50
		Upscale	11.0	11.1	10.9	.2	20	1.00
7	1908	Zero Gas	0	0	0	0	20	0
		Upscale	11.0	11.1	10.8	.2	20	1.00
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC

(612) 786-6020

No System Bias Check

Job

Cyprus Northshore Mining

Source

No 12 P/L/H/262 Heap Ex

Test

2 Run 1-6Date 5-24-84

Site

STACK

Operator

Bob

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	0930	Zero Gas	0	1	1	0	500	0
		Upscale	239	237	236	1	500	.20
2	1058	Zero Gas	0	1	1	0	250	0
		Upscale	239	237	238	1	250	.40
3	1252	Zero Gas	0	1	0	1	250	.40
		Upscale	239	237	237	0	250	0
4	1456	Zero Gas	0	1	0	1	250	.40
		Upscale	239	237	236	1	250	.40
5	1624	Zero Gas	0	1	0	1	250	.40
		Upscale	239	237	236	1	250	.40
6	1845	Zero Gas	0	1	0	1	250	.40
		Upscale	237	237	235	2	250	.80
7	1700	Zero Gas	0	1	0	1	250	.40
		Upscale	239	237	236	1	250	.40
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC

(612) 786-6020

CO₂ System Bias Check

Job

Cyprus Northshore Mining

Source

No 12 Re Nitrogen Hood Ex

Test

2 Run 1-6Date 5-24-84

Site

STACK

Operator

Bob

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	0930	Zero Gas	0	0	0	0	20	0
		Upscale	11.0	10.8	11.0	-2	20	1.0
2	1058	Zero Gas	0	6	0	0	20	0
		Upscale	11.0	10.8	10.9	-1	20	.50
3	1252	Zero Gas	0	0	.1	-1	20	.50
		Upscale	11.0	10.8	10.9	-1	20	.50
4	1456	Zero Gas	0	0	0	0	20	0
		Upscale	11.0	10.8	11.0	.2	20	1.00
5	1624	Zero Gas	0	6	.1	-1	20	.30
		Upscale	11.0	10.8	10.9	.1	20	.50
6	1745	Zero Gas	0	6	.1	-1	20	.50
		Upscale	11.0	10.8	11.0	.2	20	1.00
7	1807	Zero Gas	0	6	.1	-1	20	.40
		Upscale	11.0	10.8	11.0	.2	20	1.00
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC

(612) 786-6020

NO_x System Bias Check
 Job Cyprus Northshore Mixing
 Test 817 Run 13 eq Date 5-25-94
 Operator Gar

 Source 1204 WASTE GAS
 Site INLET

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	0732	Zero Gas	0	1	1	0	250	0
		Upscale	140.5	141	140	1	250	.40
2	1028	Zero Gas	0	1	0	1	250	.40
		Upscale	140.5	141	139	2	250	.80
3	1215	Zero Gas	0	1	0	1	250	.40
		Upscale	140.5	141	141	0	250	0
4	1358	Zero Gas	0	1	1	0	250	0
		Upscale	140.5	141	140	1	250	.40
5	1533	Zero Gas	0	1	0	1	250	.40
		Upscale	140.5	141	140	1	250	.40
6	1658	Zero Gas	0	1	2	1	250	.40
		Upscale	140.5	141	140	1	250	.40
7	1828	Zero Gas	0	1	2	1	250	.40
		Upscale	140.5	141	140	1	250	.40
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC

(612) 786-6020

CO₂ System Bias Check

Job

Cyprus Northshore Mining

Source

1204 WASTE GAS

Test

8-9Run 1-300Date 5-25-84

Site

INLET

Operator

603

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	0732	Zero Gas	0	0	.1	.1	20	.50
		Upscale	11.0	11.1	11.0	.1	20	.50
2	1028	Zero Gas	0	0	.2	.2	20	1.00
		Upscale	11.0	11.1	11.0	.1	20	.50
3	1215	Zero Gas	0	0	0	0	20	0
		Upscale	11.0	11.1	11.1	0	20	0
4	1358	Zero Gas	0	0	.2	.2	20	1.00
		Upscale	11.0	11.1	11.0	.1	20	.50
5	1533	Zero Gas	0	0	.1	.1	20	.50
		Upscale	11.0	11.1	10.9	.2	20	1.00
6	1658	Zero Gas	0	0	.1	.1	20	.50
		Upscale	11.0	11.1	11.0	.1	20	.50
7	1820	Zero Gas	0	0	.1	.1	20	.50
		Upscale	11.0	11.1	10.9	.2	20	1.00
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC

(612) 786-6020

Na System Bias Check

Job

Cypress Northshore Marine

Source

1204 WASTE GAS

Test

10 + 12 Run 1-3.00 Date 5-25-98

Site

STACK

Operator

B.3

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	0757	Zero Gas	0	1	0	1	250	.40
		Upscale	239	237	238	1	250	.40
2	1031	Zero Gas	0	1	3	2	250	.80
		Upscale	239	237	238	1	250	.40
3	1216	Zero Gas	0	1	1	0	250	0
		Upscale	239	237	240	3	250	1.20
4	1359	Zero Gas	0	1	0	1	250	.40
		Upscale	239	237	234	3	250	1.20
5	1534	Zero Gas	0	1	2	1	250	.40
		Upscale	239	237	237	0	250	0
6	1658	Zero Gas	0	1	0	1	250	.40
		Upscale	239	237	234	3	250	1.20
7	1827	Zero Gas	0	1	1	0	250	0
		Upscale	239	237	234	3	250	1.20
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

033194-G:\STACK\WP\FORMS\S-420-11

INTERPOLL LABORATORIES, INC

(612) 786-6020

CO₂ System Bias Check

Job

Cypress Northshore Leasing

Source

1204 WASTE GAS

Test

10⁴12 Run 1-329 Date 5-25-94

Site

STARK

Operator

B-3

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	0757	Zero Gas	0	0	0	0	20	0
		Upscale	11.0	10.8	10.8	0	20	0
2	1031	Zero Gas	0	0	.1	.1	20	.50
		Upscale	11.0	10.8	10.8	0	20	0
3	1216	Zero Gas	0	0	.1	.1	20	.50
		Upscale	11.0	10.8	10.9	.1	20	.50
4	1359	Zero Gas	0	0	.2	.2	20	1.00
		Upscale	11.0	10.8	11.0	.2	20	1.00
5	1534	Zero Gas	0	0	.1	.1	20	.50
		Upscale	11.0	10.8	10.9	.1	20	.50
6	1658	Zero Gas	0	0	.1	.1	20	.50
		Upscale	11.0	10.8	10.8	0	20	0
7	1829	Zero Gas	0	0	.1	.1	20	.50
		Upscale	11.0	10.8	10.9	.1	20	.50
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

033194-G:\STACK\WP\FORMS\S-420-11

INTERPOLL LABORATORIES, INC

(612) 786-6020

NO_x System Bias Check

Job

Cyprus Northshore Mining

Source

1104 WASTE GAS

Test

15Run 1-

Date

5-26-96

Site

STACIC

Operator

BBB

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	0719	Zero Gas	0	1	1	0	250	0
		Upscale	239	237	237	0	252	0
2	0915	Zero Gas	0	1	1	0	250	0
		Upscale	239	237	234	1	250	.40
3	1059	Zero Gas	0	1	0	1	250	.40
		Upscale	239	237	239	2	250	.80
4	1246	Zero Gas	0	1	5	2	250	.80
		Upscale	239	237	240	3	250	1.20
5		Zero Gas	0					
		Upscale						
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

033194-G:STACKWPIFORMSIS-420-11

INTERPOLL LABORATORIES, INC

(612) 786-6020

CO₂ System Bias Check

Job

Cyprus Northshore Mining

Source

1104 WASTE GAS

Test

15 Run 1Date 5-26-94

Site

STACIC

Operator

Bob

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	0719	Zero Gas	0	0	0	0	20	0
		Upscale	11.0	10.8	11.0	.2	20	1.00
2	0915	Zero Gas	0	0	0	0	20	0
		Upscale	11.0	10.8	10.9	.1	20	.50
3	1059	Zero Gas	0	0	0	0	20	0
		Upscale	11.0	10.8	11.0	.2	20	1.00
4	1246	Zero Gas	0	0	.1	-.1	20	.40
		Upscale	11.0	10.8	11.0	.2	20	1.00
5		Zero Gas	0					
		Upscale						
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC

(612) 786-6020

Na System Bias Check

Job

Source

Test

Run

Date

Site

Operator

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	0716	Zero Gas	0	1	0	1	250	.40
		Upscale	140.5	141	143	2	250	.80
2	0915	Zero Gas	0	1	2	1	250	.40
		Upscale	140.5	141	139	2	250	.80
3	1059	Zero Gas	0	1	3	2	250	.80
		Upscale	140.5	141	139	2	250	.80
4	1245	Zero Gas	0	1	3	2	250	.80
		Upscale	140.5	141	139	2	250	.80
5		Zero Gas	0					
		Upscale						
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES, INC

(612) 786-6020

CO₂ System Bias Check

Job _____

Source _____

Test _____

Run _____

Date _____

Site _____

Operator _____

Run	Time (HRS)	***	Cylinder Value (PPM)	Analyzer Resp (PPM)		Diff. CE-SB (PPM)	Span Val. (PPM)	% of Span
				Cal. Err.	Sys. Bias			
1	0710	Zero Gas	0	0	0	0	20	0
		Upscale	110	11.1	11.0	.1	20	.50
2	0915	Zero Gas	0	0	.1	.1	20	.50
		Upscale	110	11.1	10.9	.2	20	1.00
3	1059	Zero Gas	0	0	0	0	20	0
		Upscale	110	11.1	11.0	.1	20	.50
4	1245	Zero Gas	0	0	.2	.2	20	1.00
		Upscale	110	11.1	11.0	.1	20	.50
5		Zero Gas	0					
		Upscale						
6		Zero Gas	0					
		Upscale						
7		Zero Gas	0					
		Upscale						
8		Zero Gas	0					
		Upscale						
9		Zero Gas	0					
		Upscale						
10		Zero Gas	0					
		Upscale						
11		Zero Gas	0					
		Upscale						
12		Zero Gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

INTERPOLL LABORATORIES
(612) 786-6020

NG₂ System Bias Check

Job Cyprus Northshore Mining Source No 2 Boiler
Test 39 Run 527-74 Date 5-27-74 Site 5THR
Operator 605

Run	Time (HRS)	***	Cylinder Value (ppm)	Analyzer Resp (ppm)		Diff. CE-SB (ppm)	Span Val (PPM)	% of span
				Cal Err	Sys Bias			
1	0720	Zero gas	0	1	0	500	500	.20
		Upscale	476	476	476	500	500	.20
2	0848	Zero gas	0	1	1	0	500	0
		Upscale	476	476	476	0	500	0
3	1102	Zero gas	0	1	3	2	500	.40
		Upscale	476	476	478	2	500	.40
4	1216	Zero gas	0	1	3	2	500	.40
		Upscale	476	476	476	0	500	
5		Zero gas	0					
		Upscale						
6		Zero gas	0					
		Upscale						
7		Zero gas	0					
		Upscale						
8		Zero gas	0					
		Upscale						
9		Zero gas	0					
		Upscale						
10		Zero gas	0					
		Upscale						
11		Zero gas	0					
		Upscale						
12		Zero gas	0					
		Upscale						

Must be within 5% of the span for the zero or upscale cal. gas.

S420-11R

INTERPOLL LABORATORIES

Calibration Error Check

Job Cyprus Northshore MiningTest 2 Run 6 Date 5-24-94Operator BSSO₂ Calibration:Time (HRS) 0810

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	1	1	500	.20
Mid level	237.4	239.0	1.6	500	.28
High level	488	489	1	500	.20

NO_x Calibration:Time (HRS) 0810

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	0	0	500	0
Mid level	239	237	2	500	.40
High level	476	476	0	500	0

O₂ Calibration:Time (HRS) 0810

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	0	0	25	0
Mid level	13.6	13.4	.2	25	.80
High level	21.0	21.0	0	25	0

CO₂ Calibration:Time (HRS) 0810

***	Cylinder Value (ppm)	Analyzer Response (ppm)	Difference (ppm)	Span Value (ppm)	Percent of Span
Zero gas	0	0	0	20	0
Mid level	11.0	10.8	.2	20	1.00
High level	170	17.1	.1	20	.50

Must be within 2% of the span for each calibration gas

S-420-10

APPENDIX G

CALIBRATION GAS CERTIFICATION SHEETS

Interpoll Laboratories, Inc.
(612) 786-6020

CERTIFICATE OF ANALYSIS FOR
MIDRANGE STANDARD GAS FOR METHOD 3A

Vendor: Linde
Cylinder No: HA 4668
Date of Preparation: 4-4-90
Label: 16.99% CO₂ / 20.99% O₂ BAL N₂
Blend Specification: 29₂

Results Of Analyses Of Standard Gas (by Orsat)

Date of Analysis	Run	CO ₂ (% v/v)	O ₂ (% v/v)
<u>8-11-93</u>	<u>1</u>	<u>16.9</u>	<u>21.4</u>
<u>8-11-93</u>	<u>2</u>	<u>16.9</u>	<u>21.4</u>
<u>8-11-93</u>	<u>3</u>	<u>16.9</u>	<u>21.4</u>
<u> </u>	<u>4</u>	<u> </u>	<u> </u>
<u> </u>	<u>5</u>	<u> </u>	<u> </u>
<u> </u>	<u>6</u>	<u> </u>	<u> </u>
<u> </u>	Avg	<u>16.9</u>	<u>21.4</u>

Analyst: Mark Kadler

- ☒ Results are within 5% of the vendor tag value; use tag value.
☐ Results are not within 5% of the vendor tag value; conduct another set of triplicate analyses.
☐ All results within $\pm 5\%$ of the average; relabel as above.
☐ All results not within $\pm 5\%$ of the average; perform another set of triplicate analyses.

Approved by,

August 11, 1993
Date

Dr. Perry Zonnes
Dr. Perry Zonnes

S-424

7. Emission Test Procedure

7.1 Selection of Sampling Site and Sampling Points. Select a measurement site and sampling points using the same criteria that are applicable to tests performed using Method 3.

7.2 Sample Collection. Position the sampling probe at the first measurement point, and begin sampling at the same rate as used during the sampling system bias check. Maintain constant rate sampling (i.e., ± 10 percent) during the entire run. The sampling time per run shall be the same as for tests conducted using Method 3 plus twice the system response time. For each run, use only those measurements obtained after twice the response time of the measurement system has elapsed to determine the average effluent concentration.

7.3 Zero and Calibration Drift Test. Follow Section 7.4 of Method 6C.

8. Quality Control Procedures

The following quality control procedures are recommended when the results of this method are used for an emission rate correction factor, or excess air determination. The tester should select one of the following options for validating measurement results:

8.1 If both O_2 and CO_2 are measured using Method 3A, the procedures described in Section 4.4 of Method 3 should be followed to validate the O_2 and CO_2 measurement results.

8.2 If only O_2 is measured using Method 3A, measurements of the sample stream CO_2 concentration should be obtained at the sample by-pass vent discharge using an Orsat or Fyrite analyzer, or equivalent. Duplicate samples should be obtained concurrent with at least one run. Average the duplicate Orsat or Fyrite analysis results for each run. Use the average CO_2 values for comparison with the O_2 measurements in accordance with the procedures described in Section 4.4 of Method 3.

8.3 If only CO_2 is measured using Method 3A, concurrent measurements of the sample stream O_2 concentration should be obtained using an Orsat or Fyrite analyzer as described in Section 8.2. For each run, differences greater than 0.5 percent between the Method 3A results and the average of the duplicate Fyrite analysis should be investigated.

9. Emission Calculation

For all CO_2 analyzers, and for O_2 analyzers that can be calibrated with zero gas, follow Section 8 of Method 6C, except express all concentrations as percent, rather than ppm.

For O_2 analyzers that use a low-level calibration gas in place

of a zero gas, calculate the effluent gas concentration using Equation 3A-1.

$$C_{100} = \frac{C_{100} - C_{10}}{C_{10} - C_0} (\bar{C} - C_0) + C_{100} \quad \text{Eq. 3A-1}$$

Where:

- C_{100} = Effluent gas concentration, dry basis, percent.
- C_{10} = Actual concentration of the upscale calibration gas, percent.
- C_0 = Actual concentration of the low-level calibration gas, percent.
- C_{10} = Average of initial and final system calibration bias check responses for the upscale calibration gas, percent.
- C_0 = Average of initial and final system calibration bias check responses for the low-level gas, percent.
- $\bar{C}$ = Average gas concentration indicated by the gas analyzer, dry basis, percent.

10. Bibliography

Same as bibliography of Method 6C.

Particulate Loading and Emission Rates

The particulate emission rates were determined per EPA Methods 1 - 5, CFR Title 40, Part 60, Appendix A (revised July 1, 1992). In this procedure a preliminary velocity profile of the gases in the flue is obtained by means of a temperature and velocity traverse. On the basis of these values, sampling nozzles of appropriate diameter are selected to allow isokinetic sampling, a necessary prerequisite for obtaining a representative sample.

The sampling train consists of a heated glass-lined sampling probe equipped with a Type S pitot and a thermocouple. The probe is attached to a sampling module which houses the all-glass in line filter holder in a temperature controlled oven. The sampling module also houses the impinger case and a Drierite filled column. The sampling module is connected by means of an umbilical cord to the control module. The control module houses the dry test gas meter, the calibrated orifice, a leakless pump, two inclined manometers, and all controls required for operating the sampling train.

Particulate samples are collected as follows: The sample gas is drawn through the sampling probe isokinetically and passed through a 4-inch diameter Gelman Type A/E glass fiber filter where particulates are removed. The sample gas is then passed through an ice-cooled impinger train and a desiccant-packed column which absorbs remaining moisture. The sample gas then passes through a vacuum pump followed by a dry test gas meter. The gas meter integrates the sample gas flow throughout the course of the test. A calibrated orifice attached to the outlet of the gasmeter provides real time flow rate data.

A representative particulate sample was acquired by sampling for equal periods of time at the centroid of a number of equal area regions in the duct. The sampling rate is adjusted at each test point maintaining isokinetic sampling conditions. Nomographs are used for rapid determination of the sampling rate.

Particulate Loading and Emission Rates

After sampling is complete, the filter is removed and placed in a clean container. The nozzle and inlet side of the filter holder are quantitatively washed with acetone and the washings are stored in a second container. A brush is often used in the cleaning step to help dislodge deposits. The samples are returned to the laboratory where they are logged in and analyzed. The volume of the acetone rinse ("probe wash") is noted and then the rinse is quantitatively transferred to a tared 120 cc porcelain evaporating dish and the acetone evaporated off at 97-105 °F. This temperature is used to prevent condensation of atmospheric moisture due to the cooling effect induced by the evaporation of acetone. The acetone-free sample is then transferred to an oven and dried at 105 °C for 30 minutes, cooled in a desiccator over Drierite, and then weighed to the nearest .01 mg. The filter sample is quantitatively transferred to a 6-inch watch glass and dried in an oven at 105 °C for two hours. The filter and watch glass are then cooled in a desiccator and the filter weighed to the nearest .01 mg. All weighings are performed in a balance room where the relative humidity is hydrostatted to less than 50% relative humidity. Microscopic examination of the samples is performed if any unusual characteristics are observed. The weight of the acetone rinse is corrected for the acetone blank. The Drierite column is weighed on-site and the water collected by Drierite is added to the condensate so that the total amount of absorbed water may be ascertained.

Integrated flue gas samples for Orsat analysis were collected simultaneously with each pollutant sample. The samples were collected in 15-liter gas sampling bags at a constant flow rate throughout each particulate run. The bags were at a constant flow rate throughout each particulate run. The bags were then returned to the laboratory and analyzed by Orsat analysis. Standard commercially prepared solutions were used in the Orsat analyzer (sat. KOH for carbon dioxide and reduced methylene blue for oxygen).

Condensible Organic Compounds Analysis

(State of Minnesota - MPCA Exhibit C)

Method II-8672-MN

Equipment: Separatory funnel - 500 cc with Teflon stopcock

 Powder funnel - 75 mm ID with a 17 mm stem

 Evaporating dish(es) - 200 cc or 250 cc beaker

Reagents: Diethyl ether - reagent grade

 Chloroform - reagent grade

 Sodium sulfate - (ACS) granular anhydrous

 Toluene - (if 3% hydrogen peroxide is used to collect the samples)

 Glass wool (Pyrex microfiber)

PREPARATION

1. Place 1 kg of granular anhydrous sodium sulfate in a shallow tray and heat to 200°C for at least four hours. Store in a tightly sealed glass container.
2. Place a plug of clean glass wool in the stem of the powder funnel. The plug must be of sufficient size so that it is held snugly in place by its own pressure. Add a one-inch layer of dry sodium sulfate.

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SAMPLING

An all-glass impinger assembly is used in the back half of the EPA Method 5 sampling train when an organic wet catch is to be collected. The impinger assembly consists of a modified impinger, a Greenburg Smith impinger followed by another modified impinger. The third impinger should have a temperature measuring device at the outlet upstream of a final impinger or desiccant column to monitor the temperature of the outlet gas stream. Prior to the start of the test, each of the first two impingers should be charged with 100 g of Class I water. The Method 5 train should be operated as provided for in EPA Method 5. Ice should be added to the impinger bath to keep the temperature of the gas at the outlet at or less than 68°F. After the post test leak check, the impinger train is removed and impinger contents poured into a tared all-glass sample bottle and closed with a Teflon-lined cap. The sample bottle is then weighed and the total condensate calculated by subtraction of the bottle tare weight and the weight of initial water added to the impingers (200 g). A label is affixed and the sample is returned to the laboratory for analysis. The sample should be stored at 4°C if the analysis is not conducted within 48 hours.

ANALYSIS

I. ORGANICS

Caution! Work in vented hood!!!

A. Organic Blank Determination

1. Pour 125 ml of ethyl ether and 125 ml of chloroform into a tared beaker.
2. Evaporate solvent in hood at 70°F or less until no solvent remains.
3. Desiccate the sample in dish for two hours.
4. Weigh the sample to nearest 0.1 mg, record and report on Form LSC-03G.

B. Organic Sample Determination

1. Test for peroxide in sample ether using KI strips. (If KI strip shows positive, contact your supervisor before proceeding.)
2. Transfer the sample solution quantitatively to a 500 ml separatory funnel. Use the first of three 25 ml chloroform aliquots to rinse the sample container.
3. Extract with three 25 ml portions of chloroform. (Shake and vent to release pressure about 4 to 5 times each.) Allow the phases to separate. (Bottom layer is chloroform.) Draw off the bottom layer, transferring the solvent with a funnel containing a plug of sodium sulfate into a tared beaker. (Do not draw off any of the aqueous layer.)
4. After the three chloroform extractions, use two 25 ml portions of chloroform to rinse the sodium sulfate, collecting the rinses in the same tared beaker as the extracts.

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5. Next extract the sample three times with 25 ml aliquots of ethyl ether. (Shake and vent to release pressure about 4 to 5 times each.) Allow the phases to separate. (Top layer is ethyl ether.) Draw off the bottom layer (aqueous) into another separatory funnel taking less than 1 ml of the ethyl ether layer with. Decant the ethyl ether, passing it through sodium sulfate and collecting the ethyl ether in the same tared dish as the chloroform.
6. After the three ethyl ether extractions, take two 25 ml portions of ethyl ether and rinse the sodium sulfate collecting the rinses in the same tared beaker as the extracts.
7. Evaporate the solvents (chloroform and ethyl ether) in the tared beaker in the hood at 70°F or less until no solvent remains. (Use no heat and have no sources of ignition in the hood when doing this procedure.) Do not evaporate so quickly as to allow evaporative cooling to lower the temperature of the container below the dew point of water, otherwise, water will be condensed out in the container.
8. Desiccate to constant weight (two hours). Record and report the final weight to the nearest 0.1 mg on Form LSC-03G.

II. INORGANICS

If inorganic residue information is required, the following procedure should be conducted:

A. Inorganic Blank Determination

1. Vent the remaining aqueous phase from the organic extraction in the hood to remove residual organic solvents (usually overnight).
2. Decant the impinger catch into a tared evaporating dish.
3. Evaporate all of the water in the sample in an oven at 100°C. Take care not to boil to prevent bumping and loss of sample.

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4. Cool the dried sample in the desiccator and desiccate until a constant weight is obtained.
5. Report the results to the nearest 0.1 mg on Form LSC-03G.

B. Inorganic Sample Determination

Follow steps 1-5 in Section A above.

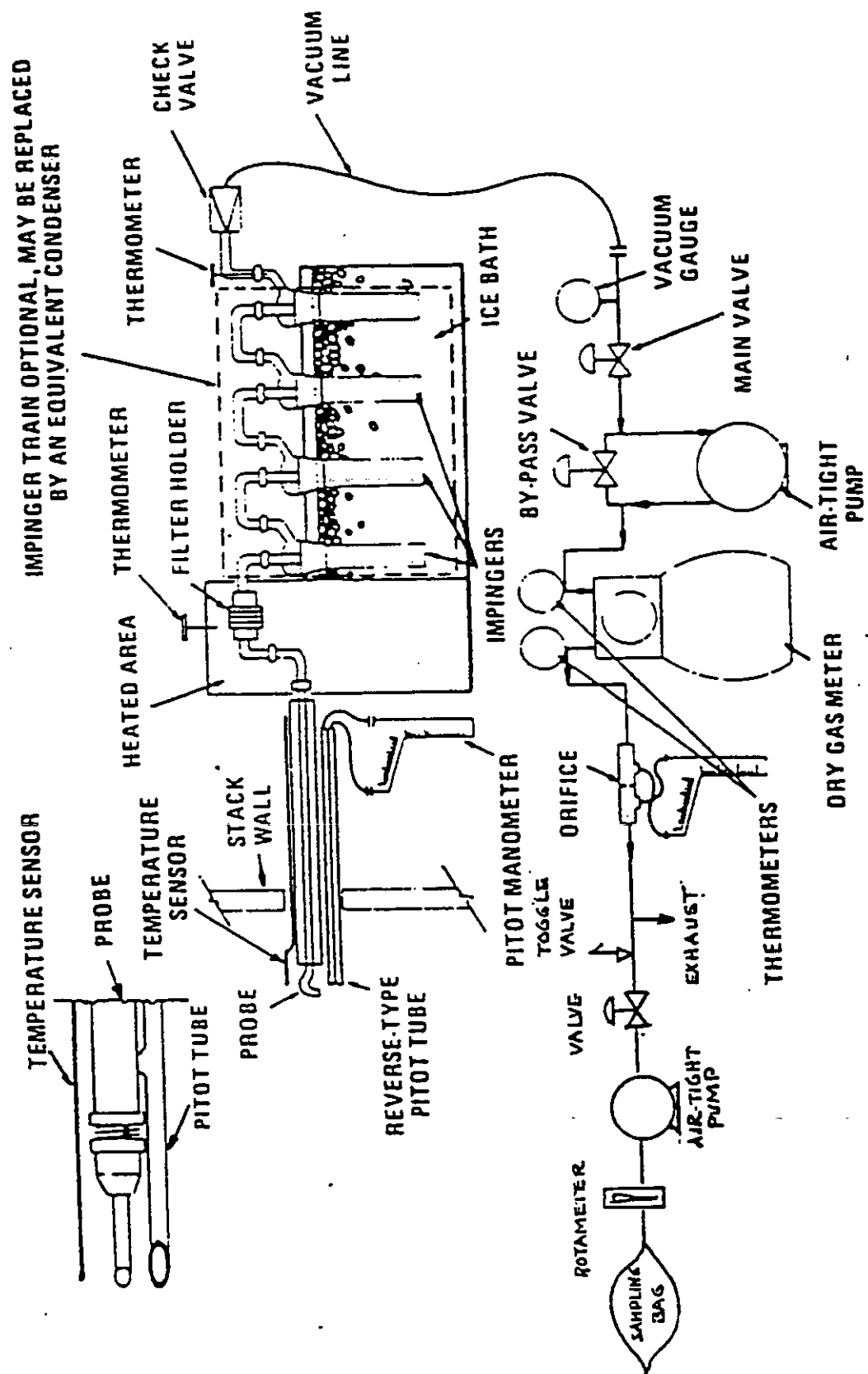
NOTES

1. For the organics determination, in the rare event that the impinger catch resulted from a Modified Method 6 determination (SO_2), whereby the solution contains dilute hydrogen peroxide ($\geq 3\%$), do not use ether as an extraction solvent. Substitute toluene for ethyl ether in Section I. (Ether in the presence of peroxide forms explosive hydroperoxide.)
2. In the organics determination, more than three extractions may be required to extract all of the organics. Additional extractions should be performed if the aqueous phase is still cloudy.
3. Special state requirements:
Michigan - Total sample evaporated in tared evaporating dish on steam bath.
Iowa - Organics and inorganics separately, as required.
Wisconsin - Use Method II-8672-WI.
Rest of states - Organics only.

REFERENCES

Proposed standards of Performance for New Stationary Sources, Federal Register 36(159) Part II, August 1, 1979.

Minnesota Pollution Control Agency, Exhibit C.



METHOD 6C—DETERMINATION OF SULFUR DIOXIDE EMISSIONS FROM STATIONARY SOURCES (INSTRUMENTAL ANALYZER PROCEDURE)

1. *Applicability and Principle*

1.1 *Applicability.* This method is applicable to the determination of sulfur dioxide (SO_2) concentrations in controlled and un-

controlled emissions from stationary sources only when specified within the regulations.

1.2 Principle. A gas sample is continuously extracted from a stack, and a portion of the sample is conveyed to an instrumental analyzer for determination of SO₂ gas concentration using an ultraviolet (UV), nondispersive infrared (NDIR), or fluorescence analyzer. Performance specifications and test procedures are provided to ensure reliable data.

2. Range and Sensitivity

2.1 Analytical Range. The analytical range is determined by the instrumental design. For this method, a portion of the analytical range is selected by choosing the span of the monitoring system. The span of the monitoring system shall be selected such that the pollutant gas concentration equivalent to the emission standard is not less than 30 percent of the span. If at any time during a run the measured gas concentration exceeds the span, the run shall be considered invalid.

2.2 Sensitivity. The minimum detectable limit depends on the analytical range, span, and signal-to-noise ratio of the measurement system. For a well designed system, the minimum detectable limit should be less than 2 percent of the span.

3. Definitions

3.1 Measurement System. The total equipment required for the determination of gas concentration. The measurement system consists of the following major subsystems:

3.1.1 Sample Interface. That portion of a system used for one or more of the following: sample acquisition, sample transport, sample conditioning, or protection of the analyzers from the effects of the stack effluent.

3.1.2 Gas Analyzer. That portion of the system that senses the gas to be measured and generates an output proportional to its concentration.

3.1.3 Data Recorder. A strip chart recorder, analog computer, or digital recorder for recording measurement data from the analyzer output.

3.2 Span. The upper limit of the gas concentration measurement range displayed on the data recorder.

3.3 Calibration Gas. A known concentration of a gas in an appropriate diluent gas.

3.4 Analyzer Calibration Error. The difference between the gas concentration exhibited by the gas analyzer and the known concentration of the calibration gas when the calibration gas is introduced directly to the analyzer.

3.5 Sampling System Bias. The difference between the gas concentrations exhibited by the measurement system when a known concentration gas is introduced at the outlet of the sampling probe and when

the same gas is introduced directly to the analyzer.

3.6 Zero Drift. The difference in the measurement system output reading from the initial calibration response at the zero concentration level after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

3.7 Calibration Drift. The difference in the measurement system output reading from the initial calibration response at a mid-range calibration value after a stated period of operation during which no unscheduled maintenance, repair, or adjustment took place.

3.8 Response Time. The amount of time required for the measurement system to display 95 percent of a step change in gas concentration on the data recorder.

3.9 Interference Check. A method for detecting analytical interferences and excessive biases through direct comparison of gas concentrations provided by the measurement system and by a modified Method 6 procedure. For this check, the modified Method 6 samples are acquired at the sample by-pass discharge vent.

3.10 Calibration Curve. A graph or other systematic method of establishing the relationship between the analyzer response and the actual gas concentration introduced to the analyzer.

4. Measurement System Performance Specifications

4.1 Analyzer Calibration Error. Less than ± 2 percent of the span for the zero, mid-range, and high-range calibration gases.

4.2 Sampling System Bias. Less than ± 5 percent of the span for the zero, and mid- or high-range calibration gases.

4.3 Zero Drift. Less than ± 3 percent of the span over the period of each run.

4.4 Calibration Drift. Less than ± 3 percent of the span over the period of each run.

4.5 Interference Check. Less than ± 7 percent of the modified Method 6 result for each run.

5. Apparatus and Reagents

5.1 Measurement System. Any measurement system for SO₂ that meets the specifications of this method. A schematic of an acceptable measurement system is shown in Figure 6C-1. The essential components of the measurement system are described below:

5.1.1 Sample Probe. Glass, stainless steel, or equivalent, of sufficient length to traverse the sample points. The sampling probe shall be heated to prevent condensation.

5.1.2 Sample Line. Heated (sufficient to prevent condensation) stainless steel or

Teflon tubing, to transport the sample gas to the moisture removal system.

5.1.3 Sample Transport Lines. Stainless steel or Teflon tubing, to transport the sample from the moisture removal system to the sample pump, sample flow rate control, and sample gas manifold.

5.1.4 Calibration Valve Assembly. A three-way valve assembly, or equivalent, for blocking the sample gas flow and introducing calibration gases to the measurement system at the outlet of the sampling probe when in the calibration mode.

5.1.5 Moisture Removal System. A refrigerator-type condenser or similar device (e.g., permeation dryer), to remove condensate continuously from the sample gas while maintaining minimal contact between the condensate and the sample gas. The moisture removal system is not necessary for analyzers that can measure gas concentrations on a wet basis; for these analyzers, (1) heat the sample line and all interface components up to the inlet of the analyzer sufficiently to prevent condensation, and (2) determine the moisture content and correct the measured gas concentrations to a dry basis using appropriate methods, subject to the approval of the Administrator. The determination of sample moisture content is not necessary for pollutant analyzers that measure concentrations on a wet basis when (1) a wet basis CO_2 analyzer operated according to Method 3A is used to obtain simultaneous measurements, and (2) the pollutant/ CO_2 measurements are used to determine emissions in units of the standard.

5.1.6 Particulate Filter. An in-stack or heated (sufficient to prevent water condensation) out-of-stack filter. The filter shall be borosilicate or quartz glass wool, or glass fiber mat. Additional filters at the inlet or outlet of the moisture removal system and inlet of the analyzer may be used to prevent accumulation of particulate material in the measurement system and extend the useful life of the components. All filters shall be fabricated of materials that are nonreactive to the gas being sampled.

5.1.7 Sample Pump. A leak-free pump, to pull the sample gas through the system at a flow rate sufficient to minimize the response time of the measurement system. The pump may be constructed of any material that is nonreactive to the gas being sampled.

5.1.8 Sample Flow Rate Control. A sample flow rate control valve and rotameter, or equivalent, to maintain a constant sampling rate within 10 percent.

(NOTE: The tester may elect to install a back-pressure regulator to maintain the sample gas manifold at a constant pressure in order to protect the analyzer(s) from overpressurization, and to minimize the need for flow rate adjustments.)

5.1.9 Sample Gas Manifold. A sample gas manifold, to divert a portion of the sample gas stream to the analyzer, and the remainder to the by-pass discharge vent. The sample gas manifold should also include provisions for introducing calibration gases directly to the analyzer. The manifold may be constructed of any material that is non-reactive to the gas being sampled.

5.1.10 Gas Analyzer. A UV or NDIR absorption or fluorescence analyzer, to determine continuously the SO_2 concentration in the sample gas stream. The analyzer shall meet the applicable performance specifications of Section 4. A means of controlling the analyzer flow rate and a device for determining proper sample flow rate (e.g., precision rotameter, pressure gauge downstream of all flow controls, etc.) shall be provided at the analyzer.

(NOTE: Housing the analyzer(s) in a clean, thermally-stable, vibration-free environment will minimize drift in the analyzer calibration.)

5.1.11 Data Recorder. A strip chart recorder, analog computer, or digital recorder, for recording measurement data. The data recorder resolution (i.e., readability) shall be 0.5 percent of span. Alternatively, a digital or analog meter having a resolution of 0.5 percent of span may be used to obtain the analyzer responses and the readings may be recorded manually. If this alternative is used, the readings shall be obtained at equally spaced intervals over the duration of the sampling run. For sampling run durations of less than 1 hour, measurements at 1-minute intervals or a minimum of 30 measurements, whichever is less restrictive, shall be obtained. For sampling run durations greater than 1 hour, measurements at 2-minute intervals or a minimum of 96 measurements, whichever is less restrictive, shall be obtained.

5.2 Method 6 Apparatus and Reagents. The apparatus and reagents described in Method 6, and shown by the schematic of the sampling train in Figure 6C-2, to conduct the interference check.

5.3 SO_2 Calibration Gases. The calibration gases for the gas analyzer shall be SO_2 in N_2 or SO_2 in air. Alternatively, SO_2/CO_2 , SO_2/O_2 , or $\text{SO}_2/\text{CO}_2/\text{O}_2$ gas mixtures in N_2 may be used. For fluorescence-based analyzers, the O_2 and CO_2 concentrations of the calibration gases as introduced to the analyzer shall be within 1 percent (absolute) O_2 and 1 percent (absolute) CO_2 of the O_2 and CO_2 concentrations of the effluent samples as introduced to the analyzer. Alternatively, for fluorescence-based analyzers, use calibration blends of SO_2 in air and the nomographs provided by the vendor to determine the quenching correction factor (the effluent O_2 and CO_2 concentrations must be

known). Use three calibration gases as specified below:

5.3.1 High-Range Gas. Concentration equivalent to 80 to 90 percent of the span.

5.3.2 Mid-Range Gas. Concentration equivalent to 50 to 60 percent of the span.

5.3.3 Zero Gas. Concentration of less than 0.25 percent of the span. Purified ambient air may be used for the zero gas by passing air through a charcoal filter, or through one or more impingers containing a solution of 3 percent H_2O_2 .

6. Measurement System Performance Test Procedures

Perform the following procedures before measurement of emissions (Section 7).

6.1 Calibration Gas Concentration Verification. There are two alternatives for establishing the concentrations of calibration gases. Alternative Number 1 is preferred.

6.1.1 Alternative Number 1—Use of calibration gases that are analyzed following the Environmental Protection Agency Traceability Protocol Number 1 (see Citation 1 in the Bibliography). Obtain a certification from the gas manufacturer that Protocol Number 1 was followed.

6.1.2 Alternative Number 2—Use of calibration gases not prepared according to Protocol Number 1. If this alternative is chosen, obtain gas mixtures with a manufacturer's tolerance not to exceed ± 2 percent of the tag value. Within 6 months before the emission test, analyze each of the calibration gases in triplicate using Method 6. Citation 2 in the Bibliography describes procedures and techniques that may be used for this analysis. Record the results on a data sheet (example is shown in Figure 6C-3). Each of the individual SO_2 analytical results for each calibration gas shall be within 5 percent (or 5 ppm, whichever is greater) of the triplicate set average; otherwise, discard the entire set, and repeat the triplicate analyses. If the average of the triplicate analyses is within 5 percent of the calibration gas manufacturer's cylinder tag value, use the tag value; otherwise, conduct at least three additional analyses until the results of six consecutive runs agree with 5 percent (or 5 ppm, whichever is greater) of their average. Then use this average for the cylinder value.

6.2 Measurement System Preparation. Assemble the measurement system by following the manufacturer's written instructions for preparing and preconditioning the gas analyzer and, as applicable, the other system components. Introduce the calibration gases in any sequence, and make all necessary adjustments to calibrate the analyzer and the data recorder. Adjust system components to achieve correct sampling rates.

6.3 Analyzer Calibration Error. Conduct the analyzer calibration error check by in-

troducing calibration gases to the measurement system at any point upstream of the gas analyzer as follows:

6.3.1 After the measurement system has been prepared for use, introduce the zero, mid-range, and high-range gases to the analyzer. During this check, make no adjustments to the system except those necessary to achieve the correct calibration gas flow rate at the analyzer. Record the analyzer responses to each calibration gas on a form similar to Figure 6C-4.

NOTE: A calibration curve established prior to the analyzer calibration error check may be used to convert the analyzer response to the equivalent gas concentration introduced to the analyzer. However, the same correction procedure shall be used for all effluent and calibration measurements obtained during the test.

6.3.2 The analyzer calibration error check shall be considered invalid if the gas concentration displayed by the analyzer exceeds ± 2 percent of the span for any of the calibration gases. If an invalid calibration is exhibited, take corrective action, and repeat the analyzer calibration error check until acceptable performance is achieved.

6.4 Sampling System Bias Check. Perform the sampling system bias check by introducing calibration gases at the calibration valve installed at the outlet of the sampling probe. A zero gas and either the mid-range or high-range gas, whichever most closely approximates the effluent concentrations, shall be used for this check as follows:

6.4.1 Introduce the upscale calibration gas, and record the gas concentration displayed by the analyzer on a form similar to Figure 6C-6. Then introduce zero gas, and record the gas concentration displayed by the analyzer. During the sampling system bias check, operate the system at the normal sampling rate, and make no adjustments to the measurement system other than those necessary to achieve proper calibration gas flow rates at the analyzer. Alternately introduce the zero and upscale gases until a stable response is achieved. The tester shall determine the measurement system response time by observing the times required to achieve a stable response for both the zero and upscale gases. Note the longer of the two times as the response time.

6.4.2 The sampling system bias check shall be considered invalid if the difference between the gas concentrations displayed by the measurement system for the analyzer calibration error check and for the sampling system bias check exceeds ± 5 percent of the span for either the zero or upscale calibration gas. If an invalid calibration is exhibited, take corrective action, and repeat the

sampling system bias check until acceptable performance is achieved. If adjustment to the analyzer is required, first repeat the analyzer calibration error check, then repeat the sampling system bias check.

7. Emission Test Procedure

7.1 Selection of Sampling Site and Sampling Points. Select a measurement site and sampling points using the same criteria that are applicable to Method 6.

7.2 Interference Check Preparation. For each individual analyzer, conduct an interference check for at least three runs during the initial field test on a particular source category. Retain the results, and report them with each test performed on that source category.

If an interference check is being performed, assemble the modified Method 6 train (flow control valve, two midjet impingers containing 3 percent H_2O_2 , and dry gas meter) as shown in Figure 6C-2. Install the sampling train to obtain a sample at the measurement system sample by-pass discharge vent. Record the initial dry gas meter reading.

7.3 Sample Collection. Position the sampling probe at the first measurement point, and begin sampling at the same rate as used during the sampling system bias check. Maintain constant rate sampling (i.e., ± 10 percent) during the entire run. The sampling time per run shall be the same as for Method 6 plus twice the system response time. For each run, use only those measurements obtained after twice response time of the measurement system has elapsed, to determine the average effluent concentration. If an interference check is being performed, open the flow control valve on the modified Method 6 train concurrent with the initiation of the sampling period, and adjust the flow to 1 liter per minute (± 10 percent).

(Note: If a pump is not used in the modified Method 6 train, caution should be exercised in adjusting the flow rate since overpressurization of the impingers may cause leakage in the impinger train, resulting in positively biased results).

7.4 Zero and Calibration Drift Tests. Immediately preceding and following each run, or if adjustments are necessary for the measurement system during the run, repeat the sampling system bias check procedure described in Section 6.4 (Make no adjustments to the measurement system until after the drift checks are completed.) Record and analyzer's responses on a form similar to Figure 6C-5.

7.4.1 If either the zero or upscale calibration value exceeds the sampling system bias specification, then the run is considered invalid. Repeat both the analyzer calibration error check procedure (Section 6.3) and the sampling system bias check procedure (Section 6.4) before repeating the run.

7.4.2 If both the zero and upscale calibration values are within the sampling system bias specification, then use the average of the initial and final bias check values to calculate the gas concentration for the run. If the zero or upscale calibration drift value exceeds the drift limits, based on the difference between the sampling system bias check responses immediately before and after the run, repeat both the analyzer calibration error check procedure (Section 6.3) and the sampling system bias check procedure (Section 6.4) before conducting additional runs.

7.5 Interference Check (if performed). After completing the run, record the final dry gas meter reading, meter temperature, and barometric pressure. Recover and analyze the contents of the midjet impingers, and determine the SO_2 gas concentration using the procedures of Method 6. (It is not necessary to analyze EPA performance audit samples for Method 6.) Determine the average gas concentration exhibited by the analyzer for the run. If the gas concentrations provided by the analyzer and the modified Method 6 differ by more than 7 percent of the modified Method 6 result, the run is invalidated.

8. Emission Calculation

The average gas effluent concentration is determined from the average gas concentration displayed by the gas analyzer, and is adjusted for the zero and upscale sampling system bias checks, as determined in accordance with Section 7.4. The average gas concentration displayed by the analyzer may be determined by integration of the area under the curve for chart recorders, or by averaging all of the effluent measurements. Alternatively, the average may be calculated from measurements recorded at equally spaced intervals over the entire duration of the run. For sampling run durations of less than 1 hour, measurements at 1-minute intervals or a minimum of 30 measurements, whichever is less restrictive, shall be used. For sampling run durations greater than 1 hour, measurements at 2-minute intervals or a minimum of 96 measurements, whichever is less restrictive, shall be used. Calculate the effluent gas concentration using Equation 6C-1.

$$C_{\text{gas}} = (\bar{C} - C_0) \frac{C_{\text{ms}}}{C_m - C_0}$$

Eq. 6C-1

Where:

C_{gas} = Effluent gas concentration, dry basis, ppm.

- $\bar{C}$ = Average gas concentration indicated by gas analyzer, dry basis, ppm.
 C_o = Average of initial and final system calibration bias check responses for the zero gas, ppm.
 C_m = Average of initial and final system calibration bias check responses for the upscale calibration gas, ppm.
 C_{ma} = Actual concentration of the upscale calibration gas, ppm.

9. Bibliography

1. Traceability Protocol for Establishing True Concentrations of Gases Used for Calibrations and Audits of Continuous Source Emission Monitors: Protocol Number 1. U.S. Environmental Protection Agency, Quality Assurance Division. Research Triangle Park, NC. June 1978.

2. Westlin, Peter R. and J. W. Brown. Methods for Collecting and Analyzing Gas Cylinder Samples. Source Evaluation Society Newsletter. 3(3):5-15. September 1978.

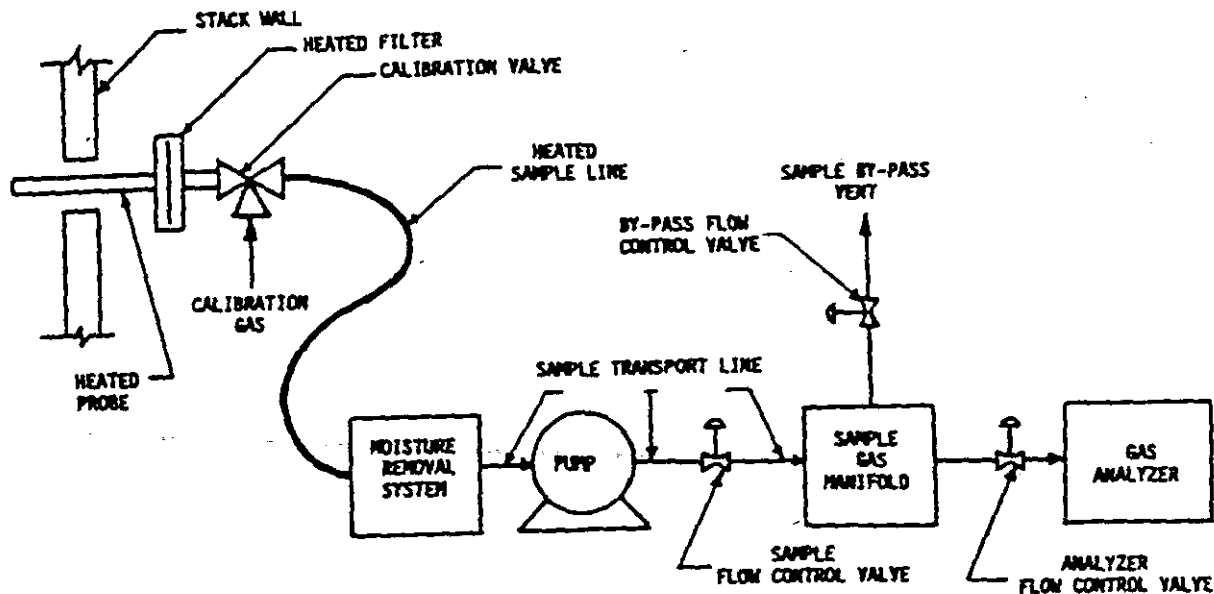


Figure 6C-1. Measurement system schematic.

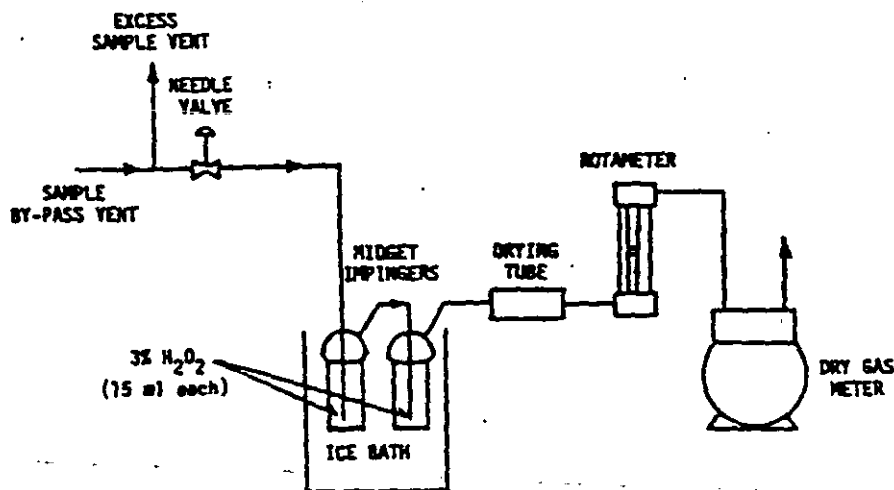


Figure 6C-2. Interference check sampling train.

FIGURE 6C-3—ANALYSIS OF CALIBRATION GASES

Analytic method used _____

Date _____

**METHOD 7E—DETERMINATION OF NITROGEN
OXIDES EMISSIONS FROM STATIONARY
SOURCES (INSTRUMENTAL ANALYZER PRO-
CEDURE)**

1. *Applicability and Principle*

1.1 *Applicability.* This method is applicable to the determination of nitrogen oxides (NO_x) concentrations in emissions from stationary sources only when specified within the regulations.

1.2 *Principle.* A gas sample is continuously extracted from a stack, and a portion of the sample is conveyed to an instrumental chemiluminescent analyzer for determination of NO_x concentration. Performance specifications and test procedures are provided to ensure reliable data.

2. *Range and Sensitivity*

Same as Method 6C, Sections 2.1 and 2.2.

3. *Definitions*

3.1 *Measurement System.* The total equipment required for the determination of NO_x concentration. The measurement system consists of the following major subsystems:

3.1.1 *Sample Interface, Gas Analyzer, and Data Recorder.* Same as Method 6C, Sections 3.1.1, 3.1.2, and 3.1.3.

3.1.2 *NO_x to NO Converter.* A device that converts the nitrogen dioxide (NO_2) in the sample gas to nitrogen oxide (NO).

3.2 *Span, Calibration Gas, Analyzer Calibration Error, Sampling System Bias, Zero Drift, Calibration Drift, and Response Time.* Same as Method 6C, Sections 3.2 through 3.8.

3.3 *Interference Response.* The output response of the measurement system to a

component in the sample gas, other than the gas component being measured.

4. Measurement System Performance Specifications

Same as Method 6C, Sections 4.1 through 4.4.

5. Apparatus and Reagents

5.1 Measurement System. Any measurement system for NO_x that meets the specifications of this method. A schematic of an acceptable measurement system is shown in Figure 6C-1 of Method 6C. The essential components of the measurement system are described below:

5.1.1 Sample Probe, Sample Line, Calibration Valve Assembly, Moisture Removal System, Particulate Filter, Sample Pump, Sample Flow Rate Control, Sample Gas Manifold, and Data Recorder. Same as Method 6C, Sections 5.1.1 through 5.1.9, and 5.1.11.

5.1.2 NO_x to NO Converter. That portion of the system that converts the nitrogen dioxide (NO₂) in the sample gas to nitrogen oxide (NO). An NO_x to NO converter is not necessary if data are presented to demonstrate that the NO_x portion of the exhaust gas is less than 5 percent of the total NO_x concentration.

5.1.3 NO_x Analyzer. An analyzer based on the principles of chemiluminescence, to determine continuously the NO_x concentration in the sample gas stream. The analyzer shall meet the applicable performance specifications of Section 4. A means of controlling the analyzer flow rate and a device for determining proper sample flow rate (e.g., precision rotameter, pressure gauge downstream of all flow controls, etc.) shall be provided at the analyzer.

5.2 NO_x Calibration Gases. The calibration gases for the NO_x analyzer shall be NO in N₂. Three calibration gases, as specified in Sections 5.3.1 through 5.3.3. of Method 6C, shall be used. Ambient air may be used for the zero gas.

6. Measurement System Performance Test Procedures

Perform the following procedures before measurement of emissions (Section 7).

6.1 Calibration Gas Concentration Verification. Follow Section 6.1 of Method 6C, except if calibration gas analysis is required, use Method 7, and change all 5 percent performance values to 10 percent (or 10 ppm, whichever is greater).

6.2 Interference Response. Conduct an interference response test of the analyzer prior to its initial use in the field. Thereafter, recheck the measurement system if changes are made in the instrumentation that could alter the interference response (e.g., changes in the gas detector). Conduct the interference response in accordance with Section 5.4 of Method 20.

6.3 Measurement System Preparation, Analyzer Calibration Error, and Sample System Bias Check. Follow Sections 6.2 through 6.4 of Method 6C.

6.4 NO_x to NO Conversion Efficiency. Unless data are presented to demonstrate that the NO_x concentration within the sample stream is not greater than 5 percent of the NO_x concentration, conduct an NO_x to NO conversion efficiency test in accordance with Section 5.6 of Method 20.

7. Emission Test Procedure

7.1 Selection of Sampling Site and Sampling Points. Select a measurement site and sampling points using the same criteria that are applicable to tests performed using Method 7.

7.2 Sample Collection. Position the sampling probe at the first measurement point, and begin sampling at the same rate as used during the system calibration drift test. Maintain constant rate sampling (i.e., ± 10 percent) during the entire run. The sampling time per run shall be the same as the total time required to perform a run using Method 7, plus twice the system response time. For each run, use only those measurements obtained after twice the response time of the measurement system has elapsed, to determine the average effluent concentration.

7.3 Zero and Calibration Drift Test. Follow Section 7.4 of Method 6C.

8. Emission Calculation

Follow Section 8 of Method 6C.

9. Bibliography

Same as bibliography of Method 6C.

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It is proposed that 40 CFR Parts 60 and 61 be amended as follows:

1. The authority citations for Parts 60 and 61 continue to read as follows:

42 U.S.C. 7401, 7411, 7412, 7414, 7416, and 7601.

2. In Part 60, by adding Method 29 to Appendix A as follows:

Appendix A - Test Methods

* * * * *

Method 29 - Determination of Metals Emissions from Stationary Sources

1. Applicability and Principle

1.1 Applicability. This method is applicable to the determination of total chromium (Cr), cadmium (Cd), arsenic (As), nickel (Ni), manganese (Mn), beryllium (Be), copper (Cu), zinc (Zn), lead (Pb), selenium (Se), phosphorus (P), thallium (Tl), silver (Ag), antimony (Sb), barium (Ba), and mercury (Hg) emissions from stationary sources. This method may also be used for determining particulate emissions when the prescribed procedures and precautions are followed. Changes in the procedures to further facilitate particulate determination may affect the front-half mercury determination.

1.2 Principle. A stack sample is withdrawn isokinetically from the source, with particulate emissions collected in the probe and on a heated filter and gaseous emissions collected in solutions of acidic hydrogen peroxide and acidic potassium

permanganate. The recovered samples are digested, and appropriate fractions are analyzed for mercury by cold vapor atomic absorption spectroscopy (CVAAS) and for Cr, Cd, Ni, Mn, Be, Cu, Zn, Pb, Se, P, Tl, Ag, Sb, Ba, and As by inductively coupled argon plasma emission spectroscopy (ICAP) or atomic absorption spectroscopy (AAS). Graphite furnace atomic absorption spectroscopy (GFAAS) is used for analysis of Sb, As, Dc, Pb, Se, and Tl if these elements require greater analytical sensitivity than can be obtained by ICAP. Additionally, if desired, the tester may use AAS for analysis of all metals if the resulting in-stack method detection limits meet the goal of the testing program.

2. Range, Sensitivity, Precision, and Interferences

2.1 Range. For the analysis described and for similar analyses, the ICAP response is linear over several orders of magnitude. Samples containing metal concentrations in the nanograms per ml (ng/ml) to micrograms per ml ($\mu\text{g/ml}$) range in the final analytical solution can be analyzed using this method. Samples containing greater than approximately 50 $\mu\text{g/ml}$ Cr, Pb, or As should be diluted to that level or lower for final analysis. Samples containing greater than approximately 20 $\mu\text{g/ml}$ of Cd should be diluted to that level before analysis.

2.2 Analytical Sensitivity. ICAP analytical detection limits for the sample solutions (based on SW-846, Method 6010) are approximately as follows: Sb (32 ng/ml), As (53 ng/ml), Ba (2 ng/ml), Be (0.3 ng/ml), Cd (4 ng/ml), Cr (7 ng/ml),

Cu (6 ng/ml), Pb (42 ng/ml), Mn (2 ng/ml), Ni (15 ng/ml), P (75 ng/ml), Se (75 ng/ml), Ag (7 ng/ml), Tl (40 ng/ml), and Zn (2 ng/ml). The actual method detection limits are sample dependent and may vary as the sample matrix may affect the limits. The analytical detection limits for analysis by direct aspiration AAS (based on SW-846, Method 7000 series) are approximately as follows: Sb (200 ng/ml), As (2 ng/ml), Ba (100 ng/ml), Be (5 ng/ml), Cd (5 ng/ml), Cr (50 ng/ml), Cu (20 ng/ml), Pb (100 ng/ml), Mn (10 ng/ml), Ni (40 ng/ml), Se (2 ng/ml), Ag (10 ng/ml), Tl (100 ng/ml), and Zn (5 ng/ml). The detection limit for mercury by CVAAS is approximately 0.2 ng/ml. The use of GFAAS can give added sensitivity compared to direct aspiration AAS for the following metals: Sb (3 ng/ml), As (1 ng/ml), Be (0.2 ng/ml), Cd (0.1 ng/ml), Cr (1 ng/ml), Pb (1 ng/ml), Se (2 ng/ml), and Tl (1 ng/ml).

2.3 In-stack Detection Limit.

2.3.1 Using (1) the procedures described in this method, (2) the analytical detection limits described in the previous paragraph, (3) a volume of 300 ml (Fraction 1) for the front-half and 150 ml (Fraction 2A) for the back-half samples, and (4) a stack gas sample volume of 1.25 m³, the corresponding in-stack method detection limits are presented in Table 29-1 and calculated using Eq. 29-1.

$$A \times B/C = D$$

Eq. 29-1

where:

A = Analytical detection limit, $\mu\text{g/ml}$.

B = Volume of sample prior to aliquotting for analysis, ml.

C = Stack sample volume, dsm^3 .

D = In-stack detection limit, $\mu\text{g/m}^3$.

Values in Table 29-1 are calculated for the front- and back-half and/or the total train.

2.3.2 To ensure optimum sensitivity in the measurements, the concentrations of target metals in the solutions are suggested to be at least ten times the analytical detection limits. Under certain conditions, and with greater care in the analytical procedure, this concentration can be as low as approximately three times the analytical detection limit. In all cases, on at least one sample (run) in the source test and for each metal analyzed, repetitive analyses, method of standard additions (MSA), serial dilution, or matrix spike addition, etc., shall be used to establish the quality of the data.

2.3.3 Actual in-stack method detection limits will be determined based on actual source sampling parameters and analytical results as described above. If required, the method in-stack detection limits can be made more sensitive than those shown in Table 29-1 for a specific test by using one or more of the following options:

2.3.4 A 1-hour sampling run may collect a stack gas sampling volume of about 1.25 m^3 . If the sampling time is

Front-half	Back-half	Back-half	Fractions	
	Fraction 1	Fraction 2	"Hg, only"	
Metal	Probe and Filter	Impingers 1-3	Impingers 4-6	Total Train
Antimony	7.7 (0.7)*	3.8 (0.4)*		11.5 (1.1)*
Arsenic	12.7 (0.3)*	6.4 (0.1)*		19.1 (0.4)*
Barium	0.5	0.3		0.8
Beryllium	0.07 (0.05)*	0.04 (0.03)*		0.11 (0.08)*
Cadmium	1.0 (0.02)*	0.5 (0.01)*		1.5 (0.03)*
Chromium	1.7 (0.2)*	0.8 (0.1)*		2.5 (0.3)*
Copper	1.4	0.7		2.1
Lead	10.1 (0.2)*	5.0 (0.1)*		15.1 (0.3)*
Manganese	0.5 (0.2)*	0.2 (0.1)*		0.7 (0.3)*
Mercury	0.6**	3.0**	2.0**	5.6**
Nickel	3.6	1.8		5.4
Phosphorus	18	9		27
Selenium	18 (0.5)*	9 (0.3)*		27 (0.8)*
Silver	1.7	0.9		2.6
Thallium	9.6 (0.2)*	4.8 (0.1)*		14.4 (0.3)*
Zinc	0.5	0.3		0.8

()* Detection limit when analyzed by GFAAS.

** Detection limit when analyzed by CVAAS, estimated for back-Half and total Train.

Note: Actual method in-stack detection limits will be determined based on actual source sampling parameters and analytical results as described earlier in this section.

Table 29-1. In-stack method detection limits.

increased and 5 m³ are collected, the in-stack method detection limits would be one fourth the values shown in Table 29-1 (with this change, the method is four times more sensitive than a 1-hour run. Larger sample volumes (longer runs) would make it even more sensitive.

2.3.5 The in-stack detection limits assume that all of the sample is digested (except the aliquot for mercury) and the final liquid volumes for analysis are 300 ml (Fraction 1) for the front-half and 150 ml (Fraction 2A) for the back-half sample. If the front-half volume is reduced from 300 to 30 ml, the front-half in-stack detection limits would be one tenth the values shown above (ten times more sensitive). If the back-half volume is reduced from 150 to 25 ml, the in-stack detection limits would be one sixth the above values. Matrix effect checks are necessary on sample analyses and typically are of greater significance for samples that have been concentrated to less than the normal original sample volume. Reduction to a volume of less than 25 ml may not allow redissolving of the residue and may increase interference by other compounds.

2.3.6 When both of the above modifications are used simultaneously on one sample, the resultant improvements are multiplicative. For example, where stack gas volume is increased by a factor of five and the total liquid sample digested volume of both the front- and back-halves is reduced by a factor of six, the in-stack method detection limit is reduced by a factor of thirty (the method is thirty times more sensitive). Conversely,

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reducing stack sample volume and increasing sample liquid volume will increase in-stack detection limits (the method would then be less sensitive). The front-half and back-half samples (Fractions 1A and 2A) can be combined proportionally (see Section 1.2) prior to analysis. The resultant liquid volume (excluding the mercury fractions, which must be analyzed separately) is recorded. Combining the sample in this manner does not allow the point of capture in the train to be determined. The in-stack method detection limit then becomes a single value for all metals except mercury (due to exclusion of the mercury fraction). This discussion assumes no blank correction. Blank corrections are discussed later in this method.

2.4 Precision. The precision (relative standard deviation) for each metal detected in a method development test at a sewage sludge incinerator are as follows: Sb (12.7 percent), As (13.5 percent), Ba (20.6 percent), Cd (11.5 percent), Cr (11.2 percent), Cu (11.5 percent), Pb (11.6 percent), P (14.6 percent), Se (15.3 percent), Tl (12.3 percent), and Zn (11.8 percent). The precision for Ni was 7.7 percent for another test conducted at a source simulator. Beryllium, Mn, and Ag were not detected in the tests; however, based on the analytical sensitivity of the ICAP for these metals, it is assumed that their precisions should be similar to those for the other metals when detected at similar levels.

2.5 Interferences. Iron can be a spectral interference during the analysis of As, Cr, and Cd by ICAP. Al can be a

spectral interference during the analysis of As and Pb by ICAP. Generally, these interferences can be reduced by diluting the sample, but this increases the method detection limit (in-stack detection limit). Refer to Method 6010 of Citation 1 of the Bibliography or the other analytical methods used for details on potential interferences to this method. The analyst must eliminate or reduce interferences to acceptable levels. For all GFAAS analyses, matrix modifiers should be used to limit interferences, and standards should be matrix matched.

3. Apparatus

3.1 Sampling Train. A schematic of the sampling train is shown in Figure 29-1. It is similar to the Method 5 train and consists of the following components.

3.1.1 Probe Nozzle (Probe Tip) and Borosilicate or Quartz Glass Probe Liner. Same as Method 5, Sections 2.1.1 and 2.1.2, except that glass nozzles are required unless alternate tips are constructed of materials that are free from contamination and will not interfere with the sample. If a probe tip other than glass is used, no correction to the sample test results may be made to compensate for its effect on the sample. Probe fittings of plastic such as Teflon, polypropylene, etc. are recommended over metal fittings to prevent contamination; further, if desired, a single glass piece consisting of a combined probe tip and probe liner may be used, but such a single glass piece is not a requirement of this methodology)

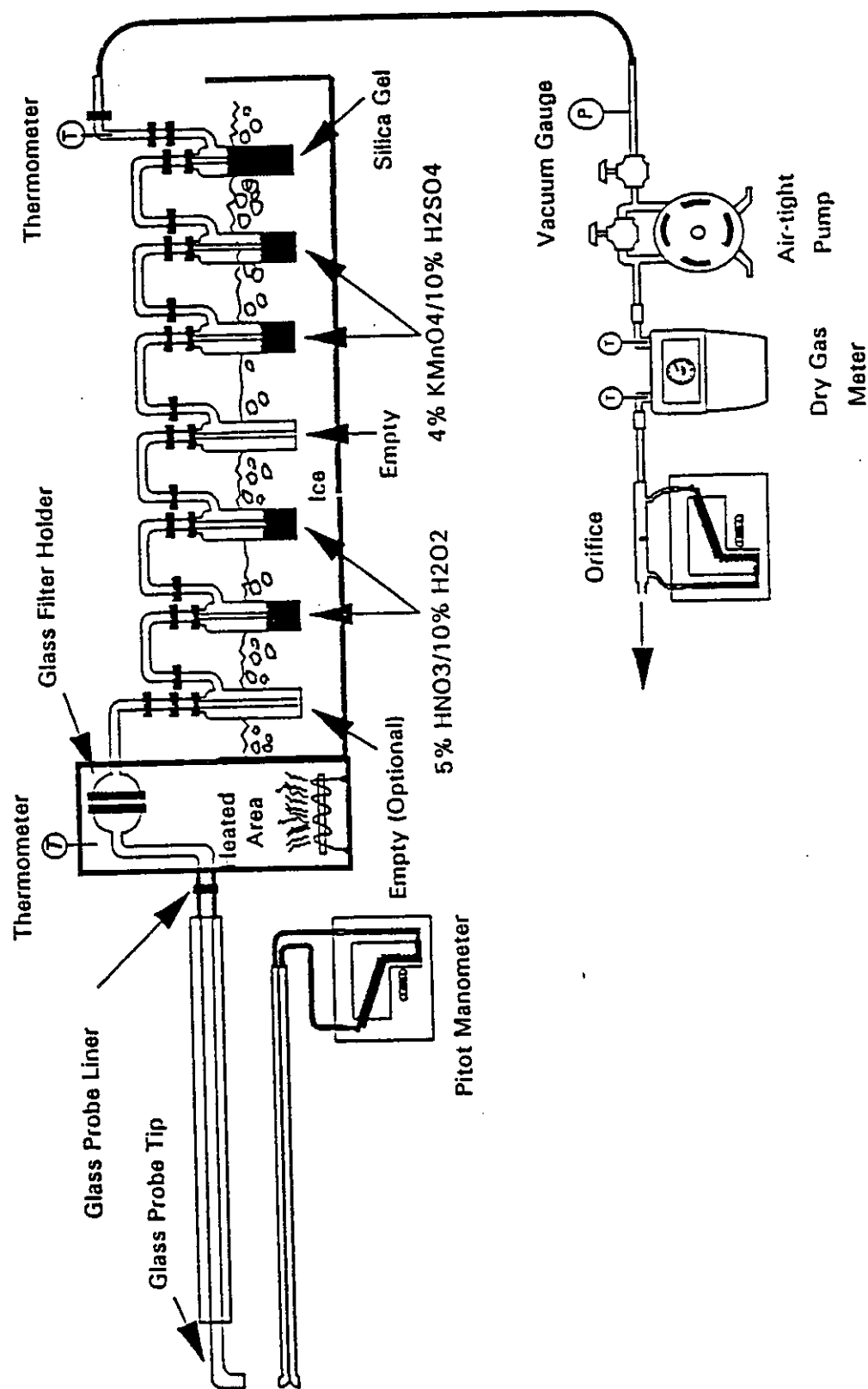


Figure 29-1. Sampling train.

3.1.2 Pitot Tube and Differential Pressure Gauge. Same as Method 2, Sections 2.1 and 2.2, respectively.

3.1.3 Filter Holder. Glass, same as Method 5, Section 2.1.5, except a Teflon filter support or other non-metallic, non-contaminating support must be used in place of the glass frit.

3.1.4 Filter Heating System. Same as Method 5, Section 2.1.6.

3.1.5 Condenser. The following system shall be used for condensing and collecting gaseous metals and determining the moisture content of the stack gas. The condensing system should consist of four to seven impingers connected in series with leak-free ground glass fittings or other leak-free, non-contaminating fittings. The first impinger is optional and is recommended as a moisture trap. The second impinger (or the first $\text{HNO}_3/\text{H}_2\text{O}_2$ impinger) shall be as described for the first impinger in Method 5. The third impinger (or second $\text{HNO}_3/\text{H}_2\text{O}_2$ impinger) shall be the Greenburg Smith impinger with the standard tip described as the second impinger in Method 5, Section 2.1.7. All other impingers are the same as the first $\text{HNO}_3/\text{H}_2\text{O}_2$ impinger previously described. A thermometer capable of measuring to within 1°C (2°F) shall be placed at the outlet of the last impinger. If mercury analysis is not to be performed, the potassium permanganate impingers and the empty impinger preceding them are removed.

3.1.6 Metering System, Barometer, and Gas Density Determination Equipment. Same as Method 5, Sections 2.1.8 through 2.1.10, respectively.

3.1.7 Teflon Tape. For capping openings and sealing connections, if necessary, on the sampling train.

3.2 Sample Recovery. Same as Method 5, Sections 2.2.1 through 2.2.8 (Probe-Liner and Probe-Nozzle Brushes or Swabs, Wash Bottles, Sample Storage Containers, Petri Dishes, Glass Graduated Cylinder, Plastic Storage Containers, Funnel and Rubber Policeman, and Glass Funnel), respectively, with the following exceptions and additions:

3.2.1 Non-metallic Probe-Liner and Probe-Nozzle Brushes or Swabs. For quantitative recovery of materials collected in the front-half of the sampling train. A description of acceptable all-Teflon component brushes or swabs are to be included in EPA's Emission Measurement Technical Information Center (EMTIC) files.

3.2.2 Sample Storage Containers. Glass bottles with Teflon-lined caps which are non-reactive to the oxidizing solutions, with capacities of 1000- and 500-ml shall be used for KMnO_4 -containing samples and blanks. Polyethylene bottles may be used for other sample types.

3.2.3 Graduated Cylinder. Glass or equivalent.

3.2.4 Funnel. Glass or equivalent.

3.2.5 Labels. For identifying samples.

3.2.6 Polypropylene Tweezers and/or Plastic Gloves. For recovery of the filter from the sampling train filter holder.

3.3 Sample Preparation and Analysis. For the analysis, the following equipment is needed:

3.3.1 Volumetric Flasks, 100-ml, 250-ml, and 1000-ml. For preparation of standards and sample dilutions.

3.3.2 Graduated Cylinders. For preparation of reagents.

3.3.3 Parr^R Bombs or Microwave Pressure Relief Vessels with Capping Station (CEM Corporation model or equivalent).

3.3.4 Beakers and Watch Glasses. 250-ml beakers for sample digestion with watch glasses to cover the tops.

3.3.5 Ring Stands and Clamps. For securing equipment such as filtration apparatus.

3.3.6 Filter Funnels. For holding filter paper.

3.3.7 Disposable Pasteur Pipets and Bulbs.

3.3.8 Volumetric Pipets.

3.3.9 Analytical Balance. Accurate to within 0.1 mg.

3.3.10 Microwave or Conventional Oven. For heating samples at fixed power levels or temperatures.

3.3.11 Hot Plates.

3.3.12 Atomic Absorption Spectrometer (AAS). Equipped with a background corrector.

3.3.12.1 Graphite Furnace Attachment. With Sb, As, Cd, Pb, Se, and Tl hollow cathode lamps (HCLs) or electrodeless discharge lamps (EDLs). Same as Bibliography Citation 1 Methods 7041 (Sb), 7060 (As), 7131 (Cd), 7421 (Pb), 7740 (Se), and 7841 (Tl).

3.3.12.2 Cold Vapor Mercury Attachment. With a mercury HCL or EDL. The equipment needed for the cold vapor mercury

attachment includes an air recirculation pump, a quartz cell, an aerator apparatus, and a heat lamp or desiccator tube. The heat lamp should be capable of raising the ambient temperature at the quartz cell by 10°C such that no condensation forms on the wall of the quartz cell. Same as Method 7470 in Citation 2 of the Bibliography.

3.3.13 Inductively Coupled Argon Plasma Spectrometer. With either a direct or sequential reader and an alumina torch. Same as EPA Method 6010 in Citation 1 of the Bibliography.

4. Reagents

4.1 Unless otherwise indicated, it is intended that all reagents conform to the specifications established by the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available; otherwise, use the best available grade.

4.2 Sampling. The reagents used in sampling are as follows:

4.2.1 Filters. The filters shall contain less than 1.3 $\mu\text{g}/\text{in.}^2$ of each of the metals to be measured. Analytical results provided by filter manufacturers are acceptable. However, if no such results are available, filter blanks must be analyzed for each target metal prior to emission testing. Quartz or glass fiber filters without organic binders shall be used. The filters should exhibit at least 99.95 percent efficiency (<0.05 percent penetration) on 0.3- μ dioctyl phthalate smoke particles. The filter efficiency test shall be conducted in

accordance with ASTM Standard Method D2986-71 (incorporated by reference). For particulate determination in sources containing sulfur dioxide (SO_2) or sulfur trioxide (SO_3), the filter material must be of a type that is unreactive to SO_2 or SO_3 , as described in Method 5. Quartz fiber filters meeting these requirements are recommended.

4.2.2 Water. To conform to ASTM Specification D1193-77, Type II (incorporated by reference). If necessary, analyze the water for all target metals prior to field use. All target metals should be less than 1 ng/ml.

4.2.3 Nitric Acid. Concentrated. Baker Instra-analyzed or equivalent.

4.2.4 Hydrochloric Acid. Concentrated. Baker Instra-analyzed or equivalent.

4.2.5 Hydrogen Peroxide, 30 Percent (V/V).

4.2.6 Potassium Permanganate.

4.2.7 Sulfuric Acid. Concentrated.

4.2.8 Silica Gel and Crushed Ice. Same as Method 5, Sections 3.1.2 and 3.1.4, respectively.

4.3 Pretest Preparation of Sampling Reagents.

4.3.1 Nitric Acid (HNO_3)/Hydrogen Peroxide (H_2O_2) Absorbing Solution, 5 Percent HNO_3 /10 Percent H_2O_2 . Add carefully with stirring 50 ml of concentrated HNO_3 to a 1000-ml volumetric flask containing approximately 500 ml of water, and then add carefully with stirring 333 ml of 30 percent H_2O_2 . Dilute to volume with

water. Mix well. The reagent shall contain less than 2 ng/ml of each target metal.

4.3.2 Acidic Potassium Permanganate (KMnO_4) Absorbing Solution, 4 Percent KMnO_4 (W/V), 10 Percent H_2SO_4 (V/V). Prepare fresh daily. Mix carefully, with stirring, 100 ml of concentrated H_2SO_4 into approximately 800 ml of water, and add water with stirring to make a volume of 1 liter: this solution is 10 percent H_2SO_4 (V/V). Dissolve, with stirring, 40 g of KMnO_4 into 10 percent H_2SO_4 (V/V) and add 10 percent H_2SO_4 (V/V) with stirring to make a volume of 1 liter: this is the acidic potassium permanganate absorbing solution. Prepare and store in glass bottles to prevent degradation. The reagent shall contain less than 2 ng/ml of Hg.

Precaution: To prevent autocatalytic decomposition of the permanganate solution, filter the solution through Whatman 541 filter paper. Also, due to the potential reaction of the potassium permanganate with the acid, there may be pressure buildup in the sample storage bottle; these bottles shall not be fully filled and shall be vented to relieve excess pressure and prevent explosion potentials. Venting is required, but should not allow contamination of the sample; a No. 70-72 hole drilled in the container cap and Teflon liner has been used.

4.3.3 Nitric Acid, 0.1 N. Add with stirring 6.3 ml of concentrated HNO_3 (70 percent) to a flask containing approximately 900 ml of water. Dilute to 1000 ml with water.

Mix well. The reagent shall contain less than 2 ng/ml of each target metal.

4.3.4 Hydrochloric Acid (HCl), 8 N. Make the desired volume of 8N HCl in the following proportions. Carefully add with stirring 690 ml of concentrated HCl to a flask containing 250 ml of water. Dilute to 1000 ml with water. Mix well. The reagent shall contain less than 2 ng/ml of Hg.

4.4 Glassware Cleaning Reagents.

4.4.1 Nitric Acid, Concentrated. Fisher ACS grade or equivalent.

4.4.2 Water. To conform to ASTM Specifications D1193-77, Type II.

4.4.3 Nitric Acid, 10 Percent (V/V). Add with stirring 500 ml of concentrated HNO₃ to a flask containing approximately 4000 ml of water. Dilute to 5000 ml with water. Mix well. Reagent shall contain less than 2 ng/ml of each target metal.

4.5 Sample Digestion and Analysis Reagents.

4.5.1 Hydrochloric Acid, Concentrated.

4.5.2 Hydrofluoric Acid, Concentrated.

4.5.3 Nitric Acid, Concentrated. Baker Instra-analyzed or equivalent.

4.5.4 Nitric Acid, 50 Percent (V/V). Add with stirring 125 ml of concentrated HNO₃ to 100 ml of water. Dilute to 250 ml with water. Mix well. Reagent shall contain less than 2 ng/ml of each target metal.

4.5.5 Nitric Acid, 5 Percent (V/V). Add with stirring 50 ml of concentrated HNO₃ to 800 ml of water. Dilute to 1000 ml with water. Mix well. Reagent shall contain less than 2 ng/ml of each target metal.

4.5.6 Water. To conform to ASTM Specifications D1193-77, Type II.

4.5.7 Hydroxylamine Hydrochloride and Sodium Chloride Solution. See Citation 2 of the Bibliography for preparation.

4.5.8 Stannous Chloride. See Citation 2 of the Bibliography for preparation.

4.5.9 Potassium Permanganate, 5 Percent (W/V). See Citation 2 of the Bibliography for preparation.

4.5.10 Sulfuric Acid, Concentrated.

4.5.11 Nitric Acid, 50 Percent (V/V).

4.5.12 Potassium Persulfate, 5 Percent (W/V). See Citation 2 of the Bibliography for preparation.

4.5.13 Nickel Nitrate, Ni(NO₃)₂·6H₂O.

4.5.14 Lanthanum Oxide, La₂O₃.

4.5.15 Hg Standard (AAS Grade), 1000 µg/ml.

4.5.16 Pb Standard (AAS Grade), 1000 µg/ml.

4.5.17 As Standard (AAS Grade), 1000 µg/ml.

4.5.18 Cd Standard (AAS Grade), 1000 µg/ml.

4.5.19 Cr Standard (AAS Grade), 1000 µg/ml.

4.5.20 Sb Standard (AAS Grade), 1000 µg/ml.

4.5.21 Ba Standard (AAS Grade), 1000 µg/ml.

4.5.22 Be Standard (AAS Grade), 1000 µg/ml.

- 4.5.23 Cu Standard (AAS Grade), 1000 $\mu\text{g/ml}$.
- 4.5.24 Mn Standard (AAS Grade), 1000 $\mu\text{g/ml}$.
- 4.5.25 Ni Standard (AAS Grade), 1000 $\mu\text{g/ml}$.
- 4.5.26 P Standard (AAS Grade), 1000 $\mu\text{g/ml}$.
- 4.5.27 Se Standard (AAS Grade), 1000 $\mu\text{g/ml}$.
- 4.5.28 Ag Standard (AAS Grade), 1000 $\mu\text{g/ml}$.
- 4.5.29 Tl Standard (AAS Grade), 1000 $\mu\text{g/ml}$.
- 4.5.30 Zn Standard (AAS Grade), 1000 $\mu\text{g/ml}$.
- 4.5.31 Al Standard (AAS Grade), 1000 $\mu\text{g/ml}$.
- 4.5.32 Fe Standard (AAS Grade), 1000 $\mu\text{g/ml}$.

4.5.33 The metals standards may also be made from solid chemicals as described in Citation 3 of the Bibliography. Citations 1, 2, or 4 of the Bibliography should be referred to for additional information on mercury standards.

4.5.34 Mercury Standards and Quality Control Samples. Prepare fresh weekly a 10 $\mu\text{g/ml}$ intermediate mercury standard by adding 5 ml of 1000 $\mu\text{g/ml}$ mercury stock solution to a 500-ml volumetric flask; dilute with stirring to 500 ml by first carefully adding 20 ml of 15 percent HNO_3 and then adding water to the 500-ml volume. Mix well. Prepare a 200 ng/ml working mercury standard solution fresh daily: add 5 ml of the 10 $\mu\text{g/ml}$ intermediate standard to a 250-ml volumetric flask, and dilute to 250 ml with 5 ml of 4 percent KMnO_4 , 5 ml of 15 percent HNO_3 , and then water. Mix well. At least six separate aliquots of the working mercury standard solution should be used to prepare the standard curve. These aliquots should contain 0.0, 1.0, 2.0,

3.0, 4.0, and 5.0 ml of the working standard solution containing 0, 200, 400, 600, 800, and 1000 ng mercury, respectively. Quality control samples should be prepared by making a separate 10 µg/ml standard and diluting until in the range of the calibration.

4.5.35 ICAP Standards and Quality Control Samples.

Calibration standards for ICAP analysis can be combined into four different mixed standard solutions as shown below.

MIXED STANDARD SOLUTIONS FOR ICAP ANALYSIS

<u>Solution</u>	<u>Elements</u>
I	As, Be, Cd, Mn, Pb, Se, Zn
II	Ba, Cu, Fe
III	Al, Cr, Ni
IV	Ag, P, Sb, Tl

Prepare these standards by combining and diluting the appropriate volumes of the 1000 µg/ml solutions with 5 percent HNO₃. A minimum of one standard and a blank can be used to form each calibration curve. However, a separate quality control sample spiked with known amounts of the target metals in quantities in the mid-range of the calibration curve should be prepared. Suggested standard levels are 25 µg/ml for AL, Cr and Pb, 15 µg/ml for Fe, and 10 µg/ml for the remaining elements. Prepare any standards containing less than 1 µg/ml of metal on a daily basis. Standards containing greater than 1 µg/ml of metal should be stable for a minimum of 1 to 2 weeks.

4.5.36 Graphite Furnace AAS Standards. Sb, As, Cd, Pb, Se, and Tl. Prepare a 10 µg/ml standard by adding 1 ml of 1000 µg/ml standard to a 100-ml volumetric flask. Dilute with stirring to

100 ml with 10 percent HNO_3 . For graphite furnace AAS, the standards must be matrix matched. Prepare a 100 ng/ml standard by adding 1 ml of the 10 $\mu\text{g/ml}$ standard to a 100-ml volumetric flask, and dilute to 100 ml with the appropriate matrix solution. Other standards should be prepared by diluting the 100 ng/ml standards. At least five standards should be used to make up the standard curve. Suggested levels are 0, 10, 50, 75, and 100 ng/ml. Quality control samples should be prepared by making a separate 10 $\mu\text{g/ml}$ standard and diluting until it is in the range of the samples. Any standards containing less than 1 $\mu\text{g/ml}$ of metal should be prepared on a daily basis. Standards containing greater than 1 $\mu\text{g/ml}$ of metal should be stable for a minimum of 1 to 2 weeks.

4.5.37 Matrix Modifiers.

4.5.37.1 Nickel Nitrate, 1 Percent (V/V). Dissolve 4.956 g of $\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$ in approximately 50 ml of water in a 100-ml volumetric flask. Dilute to 100 ml with water.

4.5.37.2 Nickel Nitrate, 0.1 Percent (V/V). Dilute 10 ml of the 1 percent nickel nitrate solution from Section 4.5.37.1 above to 100 ml with water. Inject an equal amount of sample and this modifier into the graphite furnace during AAS analysis for As.

4.5.37.3 Lanthanum. Carefully dissolve 0.5864 g of La_2O_3 in 10 ml of concentrated HNO_3 , and dilute the solution by adding it with stirring to approximately 50 ml of water. Dilute to 100 ml with water, and mix well. Inject an equal amount of sample and

this modifier into the graphite furnace during AAS analysis for Pb.

4.5.38 Whatman 541 Filter Paper (or equivalent). For filtration of digested samples.

5. Procedure

5.1 Sampling. The complexity of this method is such that, to obtain reliable results, testers and analysts should be trained and experienced with the test procedures, including source sampling, reagent preparation and handling, sample handling, safety equipment, analytical calculations, reporting, and specific descriptions throughout this method.

5.1.1 Pretest Preparation. Follow the same general procedure given in Method 5, Section 4.1.1, except that, unless particulate emissions are to be determined, the filter need not be desiccated or weighed. All sampling train glassware should first be rinsed with hot tap water and then washed in hot soapy water. Next, glassware should be rinsed three times with tap water, followed by three additional rinses with water. All glassware should then be soaked in a 10 percent (V/V) nitric acid solution for a minimum of 4 hours, rinsed three times with water, rinsed a final time with acetone, and allowed to air dry. All glassware openings where contamination can occur should be covered until the sampling train is assembled for sampling.

5.1.2 Preliminary Determinations. Same as Method 5, Section 4.1.2.

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5.1.3 Preparation of Sampling Train.

5.1.3.1 Follow the same general procedures given in Method 5, Section 4.1.3, except place 100 ml of the $\text{HNO}_3/\text{H}_2\text{O}_2$ solution (Section 4.2.1) in each of the two impingers as shown in Figure 29-1 (normally the second and third impingers). Place 100 ml of the acidic KMnO_4 absorbing solution (Section 4.2.2) in each of the two impingers as shown in Figure 29-1, and transfer approximately 200 to 300 g of preweighed silica gel from its container to the last impinger. Alternatively, the silica gel may be weighed directly in the impinger just prior to train assembly.

5.1.3.2 Several options are available to the tester based on the sampling requirements and conditions. The use of an empty first impinger can be eliminated if the moisture to be collected in the impingers will be less than approximately 100 ml. If necessary, use as applicable to this methodology the procedure described in Section 7.1.1 of Method 101A, 40 CFR Part 61, Appendix B, to maintain the desired color in the last permanganate impinger.

5.1.3.3 Retain for reagent blanks volumes of the $\text{HNO}_3/\text{H}_2\text{O}_2$ solution per Section 5.2.16 of this method and of the acidic KMnO_4 solution per Section 5.2.17. These reagent blanks should be labeled and analyzed as described in Section 7. Set up the sampling train as shown in Figure 29-1. If mercury analysis is not desired, delete the empty impinger and the two permanganate impingers following the $\text{HNO}_3/\text{H}_2\text{O}_2$ impingers. If necessary to

ensure leak-free sampling train connections, Teflon tape or other non-contaminating material should be used instead of silicone grease to prevent contamination. Precaution: Extreme care should be taken to prevent contamination within the train. Prevent the mercury collection reagent (acidic KMnO_4) from contacting any glassware of the train which is washed and analyzed for Mn. Prevent H_2O_2 from mixing with the acidic KMnO_4 .

5.1.3.4 Mercury emissions can be measured, alternatively, in a separate train using EPA Method 101A with the modifications for processing the permanganate containers as described in the precaution in Section 4.3.2 and the note in Section 5.2.11 of this method). This alternative method is applicable for measurement of mercury emissions, and it may be of special interest to sources which must measure both mercury and manganese emissions.

5.1.4 Leak-Check Procedures. Follow the leak-check procedures given in Method 5, Section 4.1.4.1 (Pretest Leak-Check), Section 4.1.4.2 (Leak-Checks During the Sample Run), and Section 4.1.4.3 (Post-Test Leak-Checks).

5.1.5 Sampling Train Operation. Follow the procedures given in Method 5, Section 4.1.5. For each run, record the data required on a data sheet such as the one shown in Figure 5-2 of Method 5.

5.1.6 Calculation of Percent Isokinetic. Same as Method 5, Section 4.1.6.

5.2 Sample Recovery.

5.2.1 Begin cleanup procedures as soon as the probe is removed from the stack at the end of a sampling period. The probe should be allowed to cool prior to sample recovery. When it can be safely handled, wipe off all external particulate matter near the tip of the probe nozzle and place a rinsed, non-contaminating cap over the probe nozzle to prevent losing or gaining particulate matter. Do not cap the probe tip tightly while the sampling train is cooling; a vacuum may form in the filter holder with the undesired result of drawing liquid from the impingers onto the filter.

5.2.2 Before moving the sampling train to the cleanup site, remove the probe from the sampling train and cap the open outlet. Be careful not to lose any condensate that might be present. Cap the filter inlet where the probe was fastened. Remove the umbilical cord from the last impinger and cap the impinger. Cap off the filter holder outlet and impinger inlet. Use non-contaminating caps, whether ground-glass stoppers, plastic caps, serum caps, or Teflon tape to close these openings.

5.2.3 Alternatively, the train can be disassembled before the probe and filter holder/oven are completely cooled if this procedure is followed: Initially disconnect the filter holder outlet/impinger inlet and loosely cap the open ends. Then disconnect the probe from the filter holder or cyclone inlet and loosely cap the open ends. Cap the probe tip and remove the umbilical cord as previously described.

5.2.4 Transfer the probe and filter-impinger assembly to a cleanup area that is clean and protected from the wind and other potential causes of contamination or loss of sample. Inspect the train before and during disassembly and note any abnormal conditions. The sample is recovered and treated as follows (see schematic in Figures 29-2a and 29-2b). Assure that all items necessary for recovery of the sample do not contaminate it.

5.2.5 Container No. 1 (Filter). Carefully remove the filter from the filter holder and place it in its identified petri dish container. Acid-washed polypropylene or Teflon coated tweezers or clean, disposable surgical gloves rinsed with water and dried should be used to handle the filters. If it is necessary to fold the filter, make certain the particulate cake is inside the fold. Carefully transfer the filter and any particulate matter or filter fibers that adhere to the filter holder gasket to the petri dish by using a dry (acid-cleaned) nylon bristle brush. Do not use any metal-containing materials when recovering this train. Seal the labeled petri dish.

5.2.6 Container No. 2 (Acetone Rinse). NOTE: Perform this section only if determination of particulate emissions are desired in addition to metals emissions. Ensuring that dust on the outside of the probe or other exterior surfaces does not get into the sample, quantitatively recover particulate matter and any condensate from the probe nozzle, probe fitting, probe liner, and front half of the filter holder by washing these components with 100 ml of acetone and placing the wash in a glass container.

Fig. 2.6.1:



Figure 29-2a. Sample recovery scheme.

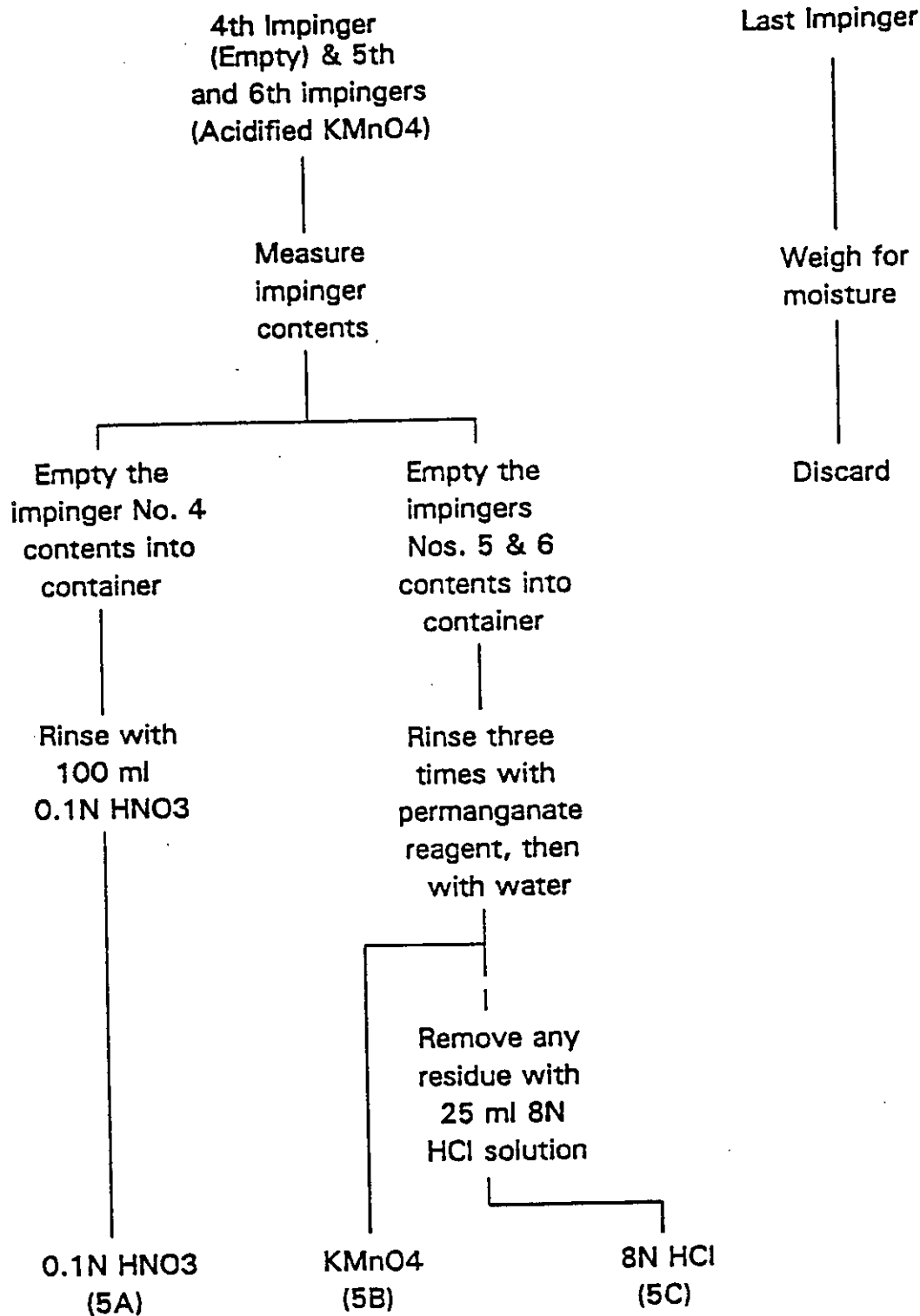


Figure 29-2b. Sample recovery scheme.

NOTE: The use of exactly 100 ml is necessary for the subsequent blank correction procedures. Distilled water may be used instead of acetone when approved by the Administrator and shall be used when specified by the Administrator; in these cases, save a water blank and follow the Administrator's directions on analysis. Perform the acetone rinse as follows: Carefully remove the probe nozzle and clean the inside surface by rinsing with acetone from a wash bottle and brushing with a non-metallic brush. Brush until the acetone rinse shows no visible particles, after which make a final rinse of the inside surface with acetone.

5.2.7 Brush and rinse the sample exposed inside parts of the fitting with acetone in a similar way until no visible particles remain. Rinse the probe liner with acetone by tilting and rotating the probe while squirting acetone into its upper end so that all inside surfaces will be wetted with acetone. Allow the acetone to drain from the lower end into the sample container. A funnel may be used to aid in transferring liquid washings to the container. Follow the acetone rinse with a non-metallic probe brush. Hold the probe in an inclined position, squirt acetone into the upper end as the probe brush is being pushed with a twisting action through the probe. Hold a sample container underneath the lower end of the probe, and catch any acetone and particulate matter which is brushed through the probe three times or more until no visible particulate matter is carried out with the acetone or until none remains in the probe liner on visual inspection. Rinse the brush with acetone, and

quantitatively collect these washings in the sample container. After the brushing, make a final acetone rinse of the probe as described above.

5.2.8 It is recommended that two people clean the probe to minimize sample losses. Between sampling runs, keep brushes clean and protected from contamination. Clean the inside of the front-half of the filter holder by rubbing the surfaces with a non-metallic nylon bristle brush and rinsing with acetone. Rinse each surface three times or more if needed to remove visible particulate. Make a final rinse of the brush and filter holder. After all acetone washings and particulate matter have been collected in the sample container, tighten the lid so that acetone will not leak out when shipped to the laboratory. Mark the height of the fluid level to determine whether or not leakage occurred during transport. Label the container clearly to identify its contents.

5.2.9 Container No. 3 (Probe Rinse). Keep the probe assembly clean and free from contamination during the probe rinse. Rinse the probe nozzle and fitting, probe liner, and front-half of the filter holder thoroughly with 100 ml of 0.1 N HNO_3 , and place the wash into a sample storage container. NOTE: The use of exactly 100 ml is necessary for the subsequent blank correction procedures. Perform the rinses as applicable and generally as described in Method 12, Section 5.2.2. Record the volume of the combined rinse. Mark the height of the fluid level on the outside of the storage container and use this mark

to determine if leakage occurs during transport. Seal the container, and clearly label the contents. Finally, rinse the nozzle, probe liner, and front-half of the filter holder with water followed by acetone, and discard these rinses.

5.2.10 Container No. 4 (Impingers 1 through 3, $\text{HNO}_3/\text{H}_2\text{O}_2$ Impingers and Moisture Knockout Impinger, when used, Contents and Rinses). Due to the potentially large quantity of liquid involved, the tester may place the impinger solutions from impingers 1 through 3 in more than one container. Measure the liquid in the first three impingers to within 0.5 ml using a graduated cylinder. Record the volume. This information is required to calculate the moisture content of the sampled flue gas. Clean each of the first three impingers, the filter support, the back half of the filter housing, and connecting glassware by thoroughly rinsing with 100 ml of 0.1 N HNO_3 using the procedure as applicable in Method 12, Section 5.2.4. NOTE: The use of exactly 100 ml of 0.1 N HNO_3 rinse is necessary for the subsequent blank correction procedures. Combine the rinses and impinger solutions, measure and record the volume. Mark the height of the fluid level, seal the container, and clearly label the contents.

5.2.11 Container Nos. 5A (0.1 N HNO_3), 5B ($\text{KMnO}_4/\text{H}_2\text{SO}_4$ absorbing solution), and 5C (8 N HCl rinse and dilution). Pour all the liquid, if any, from the impinger which was empty at the start of the run and which immediately precedes the two permanganate impingers (normally impinger No. 4) into a graduated

cylinder and measure the volume to within 0.5 ml. This information is required to calculate the moisture content of the sampled flue gas. Place the liquid in Sample Container No. 5A. Rinse the impinger (No. 4) with 100 ml of 0.1 N HNO₃, and place this into Container No. 5A.

5.2.12 Pour all the liquid from the two permanganate impingers into a graduated cylinder and measure the volume to within 0.5 ml. This information is required to calculate the moisture content of the sampled flue gas. Place this KMnO₄ solution into Container No. 5B. Using 100 ml total of fresh acidified KMnO₄ solution, rinse the two permanganate impingers and connecting glass a minimum of three times. Pour the rinses into Container No. 5B, carefully assuring transfer of all loose precipitated materials from the two impingers. Using 100 ml total of water, rinse the permanganate impingers and connecting glass a minimum of three times, and pour the rinses into Container 5B, carefully assuring transfer of all loose precipitated material, if any. Mark the height of the fluid level, and clearly label the contents. Note the precaution in Section 4.3.2. NOTE: Due to the potential reaction of KMnO₄ with acid, there may be pressure buildup in the sample storage bottles. These bottles shall not be filled completely and shall be vented to relieve excess pressure. A No. 70-72 hole drilled in the container cap and Teflon liner has been used successfully.

5.2.13 If no visible deposits remain after the above described water rinse, no further rinse is necessary. However,

if deposits do remain on the glassware, wash the impinger surfaces with 25 ml of 8 N HCl, and place the wash in a separate sample container labeled Container No. 5C containing 200 ml of water as follows. Place 200 ml of water in a sample container labeled Container No. 5C. Wash the impinger walls and stem with the HCl by turning the impinger on its side and rotating it so that the HCl contacts all inside surfaces. Use a total of only 25 ml of 8 N HCl for rinsing both permanganate impingers combined. Rinse the first impinger, then pour the actual rinse used for the first impinger into the second impinger for its rinse. Finally, pour the 25 ml of 8 N HCl rinse carefully into Container No. 5C. Mark the height of the fluid level on the outside of the bottle to determine if leakage occurs during transport.

5.2.14 Container No. 6 (Silica Gel). Note the color of the indicating silica gel to determine whether it has been completely spent and make a notation of its condition. Transfer the silica gel from its impinger to its original container and seal. The tester may use a funnel to pour the silica gel and a rubber policeman to remove the silica gel from the impinger. The small amount of particles that may adhere to the impinger wall need not be removed. Do not use water or other liquids to transfer the silica gel since weight gained in the silica gel impinger is used for moisture calculations. Alternatively, if a balance is available in the field, record the weight of the spent silica gel (or silica gel plus impinger) to the nearest 0.5 g.

5.2.15 Container No. 7 (Acetone Blank). If particulate emissions are to be determined, at least once during each field test, place a 100-ml portion of the acetone used in the sample recovery process into a labeled container for use in the front-half field reagent blank. Seal the container.

5.2.16 Container No. 8A (0.1 N HNO_3 Blank). At least once during each field test, place 300 ml of the 0.1 N HNO_3 solution used in the sample recovery process into a labeled container for use in the front-half and back-half field reagent blanks. Seal the container.

5.2.17 Container No. 8B (water blank). At least once during each field test, place 100 ml of the water used in the sample recovery process into a labeled Container No. 8B. Seal the container.

5.2.18 Container No. 9 (5 Percent HNO_3 /10 Percent H_2O_2 Blank). At least once during each field test, place 200 ml of the 5 Percent HNO_3 /10 Percent H_2O_2 solution used as the nitric acid impinger reagent into a labeled container for use in the back-half field reagent blank. Seal the container.

5.2.19 Container No. 10 (Acidified KMnO_4 Blank). At least once during each field test, place 100 ml of the acidified KMnO_4 solution used as the impinger solution and in the sample recovery process into a labeled container for use in the back-half field reagent blank for mercury analysis. Prepare the container as described in Section 5.2.11. See the note in Section 5.2.12.

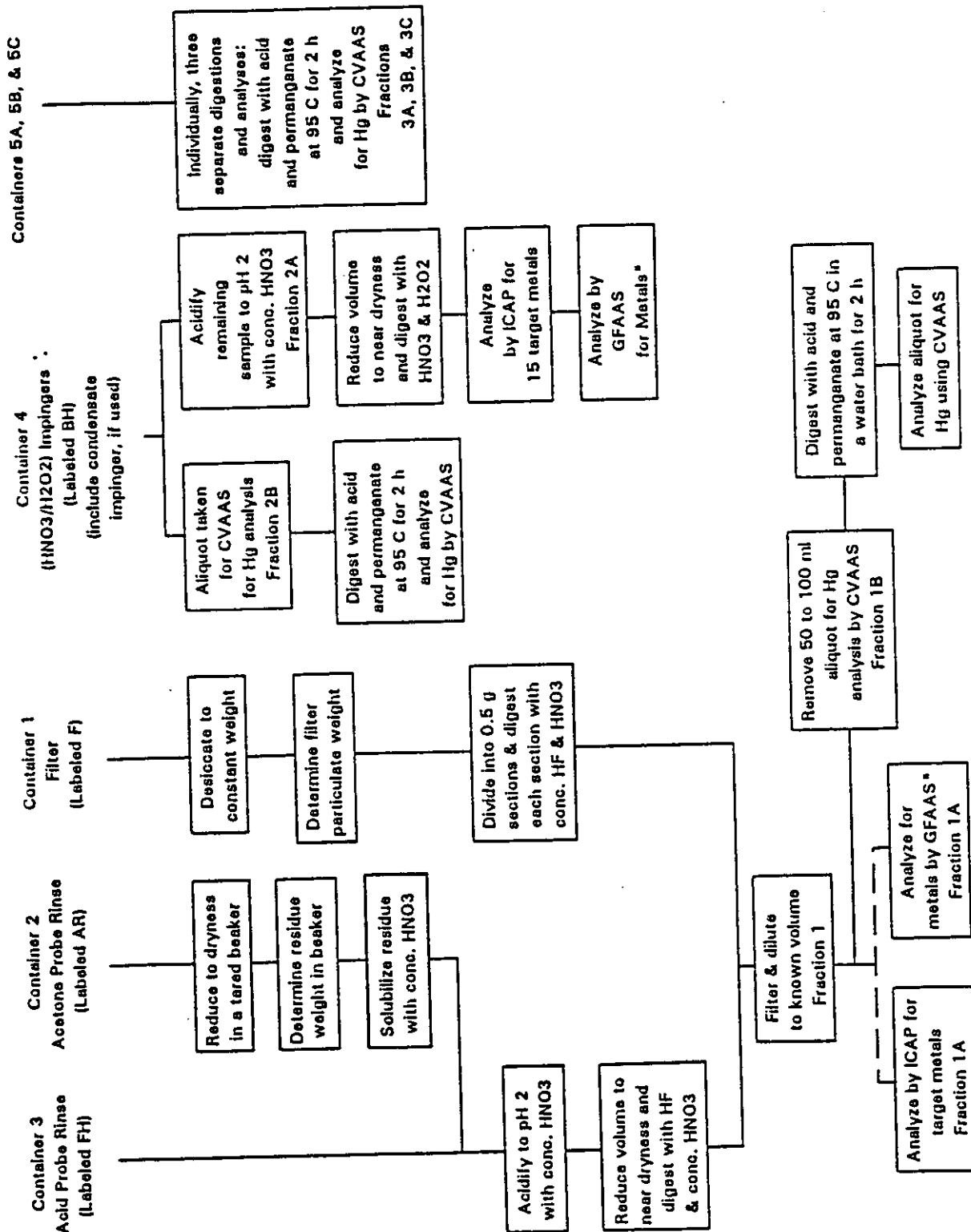
5.2.20 Container No. 11 (8 N HCl Blank). At least once during each field test, perform both of the following. Place 200 ml of water into a sample container. Pour 25 ml of 8 N HCl carefully with stirring into the container. Mix well and seal the container.

5.2.21 Container No. 12 (Filter Blank). Once during each field test, place three unused blank filters from the same lot as the sampling filters in a labeled petri dish. Seal the petri dish. These will be used in the front-half field reagent blank.

5.3 Sample Preparation. Note the level of the liquid in each of the containers and determine if any sample was lost during shipment. If a noticeable amount of leakage has occurred, either void the sample or use methods, subject to the approval of the Administrator, to correct the final results. A diagram illustrating sample preparation and analysis procedures for each of the sample train components is shown in Figure 29-3.

5.3.1 Container No. 1 (Filter). If particulate emissions are being determined, desiccate the filter and filter catch without added heat and weigh to a constant weight as described in Section 4.3 of Method 5. For analysis of metals, divide the filter with its filter catch into portions containing approximately 0.5 g each and place into the analyst's choice of either individual microwave pressure relief vessels or Parr^R Bombs. Add 6 ml of concentrated HNO₃ and 4 ml of concentrated HF to each vessel. For microwave heating, microwave the sample vessels for approximately 12-15 minutes in intervals of 1 to 2

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* Analysis by AAS for metals found at less than 2 ug/ml in digestate solution, if desired. Or analyze for each metal by AAS, if desired.

Figure 29-3. Sample preparation and analysis scheme.

minutes at 600 Watts. For conventional heating, heat the Parr^R Bombs at 140°C (285°F) for 6 hours. Then cool the samples to room temperature, and combine with the acid digested probe rinse as required in Section 5.3.3, below. NOTES:

5.3.1.1 Suggested microwave heating times are approximate and are dependent upon the number of samples being digested. Twelve to 15 minute heating times have been found to be acceptable for simultaneous digestion of up to 12 individual samples. Sufficient heating is evidenced by sorbent reflux within the vessel.

5.3.1.2 If the sampling train uses an optional cyclone, the cyclone catch should be prepared and digested using the same procedures described for the filters and combined with the digested filter samples.

5.3.2 Container No. 2 (Acetone Rinse). Note the level of liquid in the container and confirm on the analysis sheet whether or not leakage occurred during transport. If a noticeable amount of leakage has occurred, either void the sample or use methods, subject to the approval of the Administrator, to correct the final results. Measure the liquid in this container either volumetrically within 1 ml or gravimetrically within 0.5 g. Transfer the contents to an acid-cleaned, tared 250-ml beaker and evaporate to dryness at ambient temperature and pressure. If particulate emissions are being determined, desiccate for 24 hours without added heat, weigh to a constant weight according to the procedures described in Section 4.3 of Method 5, and

report the results to the nearest 0.1 mg. Redissolve the residue with 10 ml of concentrated HNO_3 . Quantitatively combine the resultant sample, including all liquid and any particulate matter, with Container No. 3 before beginning Section 5.3.3.

5.3.3 Container No. 3 (Probe Rinse). The pH of this sample shall be 2 or lower. If the pH is higher, the sample should be acidified by careful addition with stirring of concentrated HNO_3 to pH 2. The sample should be rinsed into a beaker with water, and the beaker should be covered with a ribbed watch glass. The sample volume should be reduced to approximately 20 ml by heating on a hot plate at a temperature just below boiling. Digest the sample in microwave vessels or Parr^R Bombs by quantitatively transferring the sample to the vessel or bomb, carefully adding the 6 ml of concentrated HNO_3 , 4 ml of concentrated HF , and then continuing to follow the procedures described in Section 5.3.1. Then combine the resultant sample directly with the acid digested portions of the filter prepared previously in Section 5.3.1. The resultant combined sample is referred to as Fraction 1 precursor. Filter the combined solution of the acid digested filter and probe rinse samples using Whatman 541 filter paper. Dilute to 300 ml (or the appropriate volume for the expected metals concentration) with water. This dilution is Fraction 1. Measure and record the volume of the Fraction 1 solution to within 0.1 ml. Quantitatively remove a 50-ml aliquot and label as Fraction 1B. Label the remaining 250-ml portion as

Fraction 1A. Fraction 1A is used for ICAP or AAS analysis.

Fraction 1B is used for the determination of front-half mercury.

5.3.4 Container No. 4 (Impingers 1-3). Measure and record the total volume of this sample (Fraction 2) to within 0.5 ml. Remove a 75- to 100-ml aliquot for mercury analysis and label as Fraction 2B. Label the remaining portion of Container No. 4 as aliquot Fraction 2A. Aliquot Fraction 2A defines the volume of 2A prior to digestion. All of aliquot Fraction 2A is digested to produce concentrated Fraction 2A. Concentrated Fraction 2A defines the volume of 2A after digestion and is normally 150 ml. Only concentrated Fraction 2A is analyzed for metals (except that it is not analyzed for mercury). The Fraction 2B aliquot should be prepared and analyzed for mercury as described in Section 5.4.3. Aliquot Fraction 2A shall have a pH of 2 or lower. If necessary, use concentrated HNO_3 by careful addition and stirring to lower aliquot Fraction 2A to pH 2. The sample should be rinsed into a beaker with water and the beaker covered with a ribbed watchglass. The sample volume should be reduced to approximately 20 ml by heating on a hot plate at a temperature just below boiling. Then follow either of the digestion procedures described in Sections 5.3.4.1 and 5.3.4.2, below.

5.3.4.1 Conventional Digestion Procedure. Add 30 ml of 50 percent HNO_3 , and heat for 30 minutes on a hot plate to just below boiling. Add 10 ml of 3 percent H_2O_2 and heat for 10 more minutes. Add 50 ml of hot water, and heat the sample for an additional 20 minutes. Cool, filter the sample, and dilute to

150 ml (or the appropriate volume for the expected metals concentrations) with water. This dilution is concentrated Fraction 2A. Measure and record the volume of the Fraction 2A solution to within 0.1 ml.

5.3.4.2 Microwave Digestion Procedure. Add 10 ml of 50 percent HNO₃ and heat for 6 minutes in intervals of 1 to 2 minutes at 600 Watts. Allow the sample to cool. Add 10 ml of 3 percent H₂O₂ and heat for 2 more minutes. Add 50 ml of hot water, and heat for an additional 5 minutes. Cool, filter the sample, and dilute to 150 ml (or the appropriate volume for the expected metals concentrations) with water. This dilution is concentrated Fraction 2A. Measure and record the volume of the Fraction 2A solution to within 0.1 ml. NOTE: All microwave heating times given are approximate and are dependent upon the number of samples being digested at a time. Heating times as given above have been found acceptable for simultaneous digestion of up to 12 individual samples. Sufficient heating is evidenced by solvent reflux within the vessel.

5.3.5 Container Nos. 5A, 5B, and 5C (Impingers 4, 5, and 6). Keep these samples separate from each other and measure and record the volumes of 5A and 5B separately to within 0.5 ml. Dilute sample 5C to 500 ml with water. These samples 5A, 5B, and 5C are referred to respectively as Fractions 3A, 3B, and 3C. Follow the analysis procedures described in Section 5.4.3. Because the permanganate rinse and water rinse have the capability to recover a high percentage of the mercury from the

permanganate impingers, the amount of mercury in the HCl rinse (Fraction 3C) may be very small, possibly even insignificantly small. However, as instructed in this method, add the total of any mercury measured in and calculated for the HCl rinse (Fraction 3C) to that for Fractions 1B, 2B, 3A, and 3B for calculation of the total sample mercury concentration.

5.3.6 Container No. 6 (Silica Gel). Weigh the spent silica gel (or silica gel plus impinger) to the nearest 0.5 g using a balance. (This step may be conducted in the field.)

5.4 Sample Analysis. For each sampling train, seven individual samples are generated for analysis. A schematic identifying each sample and the prescribed sample preparation and analysis scheme is shown in Figure 29-3. The first two samples, labeled Fractions 1A and 1B, consist of the digested samples from the front-half of the train. Fraction 1A is for ICAP or AAS analysis as described in Sections 5.4.1 and/or 5.4.2.

Fraction 1B is for determination of front-half mercury as described in Section 5.4.3. The back-half of the train was used to prepare the third through seventh samples. The third and fourth samples, labeled Fractions 2A and 2B, contain the digested samples from the moisture knockout, if used, and $\text{HNO}_3/\text{H}_2\text{O}_2$

Impingers 1 through 3. Fraction 2A is for ICAP or AAS analysis. Fraction 2B will be analyzed for mercury. The fifth through seventh samples, labeled Fractions 3A, 3B, and 3C, consist of the impinger contents and rinses from the empty and permanganate impingers 4, 5, and 6. These samples are analyzed for mercury as

described in Section 5.4.3. The total back-half mercury catch is determined from the sum of Fraction 2B and Fractions 3A, 3B, and 3C.

5.4.1 ICAP Analysis. Fraction 1A and Fraction 2A are analyzed by ICAP using Method 6010 or Method 200.7 (40 CFR 136, Appendix C). Calibrate the ICAP, and set up an analysis program as described in Method 6010 or Method 200.7. The quality control procedures described in Section 7.3.1 shall be followed.

Recommended wavelengths for use in the analysis are listed below.

<u>Element</u>	<u>Wavelength (nm)</u>
Aluminum	308.215
Antimony	206.833
Arsenic	193.696
Barium	455.403
Beryllium	313.042
Cadmium	226.502
Chromium	267.716
Copper	324.754
Iron	259.940
Lead	220.353
Manganese	257.610
Nickel	231.604
Phosphorous	214.914
Selenium	196.026
Silver	328.068
Thallium	190.864
Zinc	213.856

The wavelengths listed are recommended because of their sensitivity and overall acceptance. Other wavelengths may be substituted if they can provide the needed sensitivity and are treated with the same corrective techniques for spectral interference. Initially, analyze all samples for the desired target metals (except mercury) plus iron and aluminum. If iron and aluminum are present, the sample may have to be diluted so that each of these elements is at a concentration of less than

50 ppm to reduce their spectral interferences on arsenic, cadmium, chromium, and lead. NOTE: When analyzing samples in a HF matrix, an alumina torch should be used; since all front-half samples will contain HF, use an alumina torch.

5.4.2 AAS by Direct Aspiration and/or Graphite Furnace. If analysis of metals in Fraction 1A and Fraction 2A using graphite furnace or direct aspiration AAS is desired, Table 29-2 should be used to determine which techniques and methods should be applied for each target metal. Table 29-2 should also be consulted to determine possible interferences and techniques to be followed for their minimization. Calibrate the instrument according to Section 6.3 and follow the quality control procedures specified in Section 7.3.2.

5.4.3 Cold Vapor AAS Mercury Analysis. Fractions 1B, 2B, 3A, 3B, and 3C should be analyzed separately for mercury using CVAAS following the method outlined in EPA SW-846 Method 7470 or in Standard Methods for Water and Wastewater Analysis, 15th Edition, Method 303F. Set up the calibration curve (zero to 1000 ng) as described in SW-846 Method 7470 or similar to Method 303F using 300-ml BOD bottles instead of Erlenmeyers. Dilute separately, as described below, an aliquot sized from 1 ml to 10 ml of each original sample to 100 ml with water. Record the amount of the aliquot used for dilution to 100 ml. If no prior knowledge exists of the expected amount of mercury in the sample, a 5-ml aliquot is suggested for the first dilution to 100 ml and analysis. In determining the emission value for mercury, the

size of the sample aliquot used for dilution and analysis is dependent upon its mercury content. The total amount of mercury in the aliquot shall be less than 1 μg and within the range (zero to 1000 ng) of the calibration curve. Place each sample aliquot into a separate 300-ml BOD bottle, and add enough water to make a total volume of 100 ml. Then analyze the sample for mercury by adding to it sequentially the sample preparation solutions and performing the sample preparation and analysis as described in the procedures of SW-846 Method 7470 or Method 303F. If the reading maximums are off-scale (because mercury in the aliquot exceeded the calibration range), including the dilution of 1-ml aliquots of the original sample, then perform the following: dilute the original sample (or a portion of it) with 0.15 percent HNO_3 (1.5 ml concentrated HNO_3 per liter aqueous solution) so that when a 1- to 10-ml aliquot of the original sample is further diluted to 100 ml and analyzed by the procedures described above, it will yield an analysis within the range of the calibration curve.

6. Calibration

Maintain a laboratory log of all calibrations.

6.1 Sampling Train Calibration. Calibrate the sampling train components according to the indicated sections of Method 5: Probe Nozzle (Section 5.1); Pitot Tube (Section 5.2); Metering System (Section 5.3); Probe Heater (Section 5.4); Temperature Gauges (Section 5.5); Leak-Check of the Metering System (Section 5.6); and Barometer (Section 5.7).

Table 29-2. Applicable techniques, methods and minimization of interference for AAS analysis.

Metal	Technique	SW-846 Method No.	Wavelength (nm)	Interferences	
				Cause	Minimization
Fe	Aspiration	7380	248.3	Contamination	Great care taken to avoid contamination
Pb	Aspiration	7420	283.3	217.0 nm alternate	Background correction required
Pb	Furnace	7421	283.3	Poor recoveries	Matrix modifier, add 10 ul of phosphorus acid to 1 ml of prepared sample in sampler cup
Mn	Aspiration	7460	279.5	403.1 nm alternate	Background correction required
Ni	Aspiration	7520	232.0	352.4 nm alternate Fe, Co, and Cr	Background correction required Matrix matching or nitrous-oxide/acetylene flame
Se	Furnace	7740	196.0	Nonlinear response Volatility	Sample dilution or use 352.3 nm line Spike samples and reference materials and add nickel nitrate to minimize volatilization
Ag	Aspiration	7760	328.1	Adsorption & scatter Adsorption & scatter AgCl insoluble	Background correction is required and Zeeman background correction can be useful Background correction is required Avoid hydrochloric acid unless silver is in solution as a chloride complex Sample and standards monitored for aspiration rate
Tl	Aspiration	7840	276.8		Background correction is required Hydrochloric acid should not be used
Tl	Furnace	7841	276.8	Hydrochloric acid or chloride	Background correction is required Verify that losses are not occurring for volatilization by spiked samples or standard addition; Palladium is a suitable matrix modifier
Zn	Aspiration	7950	213.9	High Si, Cu, & P Contamination	Strontium removes Cu and phosphate Great care taken to avoid contamination

Table 29-2 cont.

Metal	Technique	SW-846 Method No.	Wavelength (nm)	Cause	Interferences	Minimization
Sb	Aspiration	7040	217.6	1000 mg/ml Pb Ni, Cu, or acid	Use secondary wavelength of 231.1 nm; match sample & standards' acid concentration or use nitrous oxide/acetylene flame	Secondary wavelength or Zeeman correction
Sb	Furnace	7041	217.6	High Pb	Arsenic volatilization	Spiked samples and add nickel nitrate solution to digestates prior to analysis
As	Furnace	7060	193.7	Aluminum	Calcium	Use Zeeman background correction
Ba	Aspiration	7080	553.6	Barium ionization	500 ppm Al	High hollow cathode current and narrow band set
Be	Aspiration	7090	234.9	High Mg and Si	Be in optical path	2 ml of KCl per 100 ml of sample
Be	Furnace	7091	234.9	Absorption and light scattering	As above	Add 0.1% fluoride
Cd	Aspiration	7130	228.8	As above	Excess chloride	Use method of standard additions
Cd	Furnace	7131	228.8	Pipet tips	Alkali metal	Optimize parameters to minimize effects
Cr	Aspiration	7190	357.9	200 mg/L Ca and P	Absorption & scatter	Background correction is required
Cr	Furnace	7191	357.9			As above
Cu	Aspiration	7210	324.7			Ammonium phosphate used as a matrix modifier
						Use cadmium-free tips
						KCl ionization suppressant in samples and standards
						Consult manufacturer's literature
						All calcium nitrate for a known constant effect and to eliminate effect of phosphate
						Consult manufacturer's manual

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6.2 Inductively Coupled Argon Plasma Spectrometer

Calibration. Prepare standards as outlined in Section 4.5. Profile and calibrate the instrument according to the manufacturer's recommended procedures using the above standards. The calibration should be checked once per hour. If the instrument does not reproduce the standard concentrations within 10 percent, the complete calibration procedures should be performed.

6.3 Atomic Absorption Spectrometer - Direct Aspiration, Graphite Furnace and Cold Vapor Mercury Analyses. Prepare the standards as outlined in Section 4.5 and use to calibrate the spectrometer. Calibration procedures are also outlined in the EPA methods referred to in Table 29-2 and in SW-846 Method 7470 or Standard Methods for Water and Wastewater Method 303F (for mercury). Each standard curve should be run in duplicate and the mean values used to calculate the calibration line. The instrument should be recalibrated approximately once every 10 to 12 samples.

7. Quality Control

7.1 Sampling. Field Reagent Blanks. When analyzed, the blanks in Container Nos. 7 through 12 produced previously in Sections 5.2.14 through 5.2.19, respectively, shall be processed, digested, and analyzed as follows. Digest and process one of the filters from Container No. 12 per Section 5.3.1, 100 ml from Container No. 7 per Section 5.3.2, and 100 ml from Container No. 8A per Section 5.3.3. This produces Fraction Blanks 1A and

1B from Fraction Blank 1. [If desired, the other two filters may be digested separately according to Section 5.3.1, diluted separately to 300 ml each, and analyzed separately to produce a blank value for each of the two additional filters. If these analyses are performed, they will produce two additional values for each of Fraction Blanks 1A and 1B. The three Fraction Blank 1A values will be calculated as three values of M_{fb} in Equation 3 of Section 8.4.3, then the three values shall be totalled and divided by 3 to become the value M_{fb} to be used in computing M_i by Equation 3. Similarly, the three Fraction Blank 1B values will be calculated separately as three values, totalled, averaged, and used as the value for Hg_{fb} in Equation 8 of Section 8.5.3. The analyses of the two extra filters are optional and are not a requirement of this method, but if the analyses are performed, the results must be considered as described above.] Combine 100 ml of Container No. 8A with 200 ml from Container No. 9, and digest and process the resultant volume per Section 5.3.4. This produces concentrated Fraction Blanks 2A and 2B from Fraction Blank 2. A 100-ml portion of Container No. 8A is Fraction Blank 3A. Combine 100 ml from Container No. 10 with 33 ml from Container No. 8B. This produces Fraction Blank 3B (use 400 ml as the volume of Fraction Blank 3B when calculating the blank value. Use the actual volumes when calculating all the other blank values). Dilute 225 ml from Container No. 11 to 500 ml with water. This produces Fraction Blank 3C. Analyze Fraction Blank 1A and Fraction Blank 2A per Section 5.4.1 and/or 5.4.2. Analyze

Fraction Blank 1B, Fraction Blank 2B, and Fraction Blanks 3A, 3B, and 3C per Section 5.4.3. The analysis of Fraction Blank 1A produces the front-half reagent blank correction values for the metals except for mercury; the analysis of Fraction Blank 1B produces the front-half reagent blank correction value for mercury. The analysis of concentrated Fraction Blank 2A produces the back-half reagent blank correction values for the metals except for mercury, while separate analyses of Fraction Blanks 2B, 3A, 3B, and 3C produce the back-half reagent blank correction value for mercury.

7.2 An attempt may be made to determine if the laboratory reagents used in Section 5.3 caused contamination. They should be analyzed by the procedures in Section 5.4. The Administrator will determine whether or not the laboratory blank reagent values can be used in the calculation of the test results.

7.3 Quality Control Samples. The following quality control samples should be analyzed.

7.3.1 ICAP Analysis. Follow the quality control shown in Section 8 of Method 6010. For the purposes of a three run test series, these requirements have been modified to include the following: two instrument check standard runs, two calibration blank runs, one interference check sample at the beginning of the analysis (must be within 25 percent or analyze by standard additions), one quality control sample to check the accuracy of the calibration standards (must be within 25 percent of

calibration), and one duplicate analysis (must be within 10 percent of average or repeat all analyses).

7.3.2 Direct Aspiration and/or Graphite Furnace AAS

Analysis for Sb, As, Ba, Be, Cd, Cu, Cr, Pb, Ni, Mn, Hg, P, Se, Ag, Tl, and Zn. All samples should be analyzed in duplicate. Perform a matrix spike on at least one front-half sample and one back-half sample or one combined sample. If recoveries of less than 75 percent or greater than 125 percent are obtained for the matrix spike, analyze each sample by the method of additions. A quality control sample should be analyzed to check the accuracy of the calibration standards. The results must be within 10 percent or the calibration repeated.

7.3.3 Cold Vapor AAS Analysis for Mercury. All samples should be analyzed in duplicate. A quality control sample should be analyzed to check the accuracy of the calibration standards (within 15 percent or repeat calibration). Perform a matrix spike on one sample from the HNO₃ impinger portion (must be within 25 percent or samples must be analyzed by the method of standard additions). Additional information on quality control can be obtained from EPA SW-846 Method 7470 or in Standard Methods for Water and Wastewater Method 303F.

8. Calculations

8.1 Dry Gas Volume. Using the data from this test, calculate $V_{m(std)}$, the dry gas sample volume at standard conditions as outlined in Section 6.3 of Method 5.

8.2 Volume of Water Vapor and Moisture Content. Using the data obtained from this test, calculate the volume of water vapor $V_{w(std)}$ and the moisture content B_w of the stack gas. Use Equations 5-2 and 5-3 of Method 5.

8.3 Stack Gas Velocity. Using the data from this test and Equation 2-9 of Method 2, calculate the average stack gas velocity.

8.4 Metals (Except Mercury) in Source Sample.

8.4.1 Fraction 1A, Front-Half, Metals (except Hg).

Calculate separately the amount of each metal collected in Fraction 1 of the sampling train using the following equation:

$$M_{th} = C_{s1} F_d V_{soln,1} \quad \text{Eq. 29-1}$$

where:

M_{th} = Total mass of each metal (except Hg) collected in the front half of the sampling train (Fraction 1), μg .

C_{s1} = Concentration of metal in sample Fraction 1A as read from the standard curve, $\mu\text{g/ml}$.

F_d = Dilution factor (F_d = the inverse of the fractional portion of the concentrated sample in the solution actually used in the instrument to produce the reading C_{s1} . For example, when 2 ml of Fraction 1A are diluted to 10 ml, $F_d = 5$).

$V_{soln,1}$ = Total volume of digested sample solution (Fraction 1), ml.

NOTE: If Fractions 1A and 2A are combined, proportional aliquots must be used. Appropriate changes must be made in Equations 29-1 to 29-3 to reflect this approach.

8.4.2 Fraction 2A, Back-Half, Metals (except Hg).

Calculate separately the amount of each metal collected in Fraction 2 of the sampling train using the following equation.

$$M_{bh} = C_2 F_1 V_1 \quad \text{Eq. 29-2}$$

where:

M_{bh} = Total mass of each metal (except Hg) collected in the back-half of the sampling train (Fraction 2), μg .

C_2 = Concentration of metal in sample concentrated Fraction 2A as read from the standard curve, ($\mu\text{g}/\text{ml}$).

F_1 = Aliquot factor, volume of Fraction 2 divided by volume of aliquot Fraction 2A (see Section 5.3.4).

V_1 = Total volume of digested sample solution (concentrated Fraction 2A), ml (see Section 5.3.4.1 or 5.3.4.2, as applicable).

8.4.3 Total Train, Metals (except Hg). Calculate the total amount of each of the quantified metals collected in the sampling train as follows:

$$M_t = (M_{th} - M_{tbb}) + (M_{bh} - M_{bbb}) \quad \text{Eq. 29-3}$$

where:

M_i = Total mass of each metal (separately stated for each metal) collected in the sampling train, μg .

M_{fbb} = Blank correction value for mass of metal detected in front-half field reagent blank, μg .

M_{bbb} = Blank correction value for mass of metal detected in back-half field reagent blank, μg .

NOTE: If the measured blank value for the front half (m_{fbb}) is in the range 0.0 to A μg [where A μg equals the value determined by multiplying 1.4 $\mu\text{g}/\text{in.}^2$ times the actual area in in.^2 of the filter used in the emission sample], m_{fbb} may be used to correct the emission sample value (m_{fh}); if m_{fbb} exceeds A μg , the greater of the two following values may be used:

I. A μg , or

II. the lesser of (a) m_{fbb} , or (b) 5 percent of m_{fh} .

If the measured blank value for the back-half (m_{bbb}) is in the range 0.0 to 1 μg , m_{bbb} may be used to correct the emission sample value (m_{bh}); if m_{bbb} exceeds 1 μg , the greater of the two following values may be used: 1 μg or 5 percent of m_{bh} .

8.5 Mercury in Source Sample.

8.5.1 Fraction 1B, Front-Half, Mercury. Calculate the amount of mercury collected in the front-half, Fraction 1, of the sampling train using the following equation:

$$Hg_{fh} = \frac{Q_{fh}}{V_{f1B}} (V_{soln.1}) \quad \text{Eq. 29-4}$$

where:

Hg_{fh} = Total mass of mercury collected in the front-half of the sampling train (Fraction 1), μg .

Q_{fh} = Quantity of mercury in analyzed sample, μg .

$V_{soln.1}$ = Total volume of digested sample solution (Fraction 1), ml.

V_{f1B} = Volume of Fraction 1B analyzed, ml. See the following Note.

Note: V_{f1B} is the actual amount of Fraction 1B analyzed. For example, if 1 ml of Fraction 1B were diluted to 100 ml to bring it into the proper analytical range, and 1 ml of the 100-ml dilution were analyzed, V_{f1B} would be 0.01.

8.5.2 Fractions 2B, 3A, 3B, and 3C, Back Half, Mercury. Calculate the amount of mercury collected in Fractions 2 using Equation 5 and in Fractions 3A, 3B, and 3C using Equation 6. Calculate the total amount of mercury collected in the back-half of the sampling train using Eq. 29-7.

$$Hg_{bh2} = \frac{Q_{bh2}}{V_{f2B}} (V_{soln.2}) \quad \text{Eq. 29-5}$$

where:

Hg_{bh2} = Total mass of mercury collected in Fraction 2, μg .

Q_{bh2} = Quantity of mercury in analyzed sample, μg .

$V_{soln,2}$ = Total volume of Fraction 2, ml.

V_{2B} = Volume of Fraction 2B analyzed, ml (see the following note).

Note: V_{2B} is the actual amount of Fraction 2B analyzed. For example, if 1 ml of Fraction 2B were diluted to 10 ml to bring it into the proper analytical range, and 5 ml of the 10-ml dilution was analyzed, V_{2B} would be 0.5. Use Equation 6 to calculate separately the back-half mercury for Fractions 3A, then 3B, then 3C.

$$Hg_{bh3(A,B,C)} = \frac{Q_{bh3(A,B,C)}}{V_{f3(A,B,C)}} (V_{soln,3(A,B,C)}) \quad \text{Eq. 29-6}$$

where:

$Hg_{bh3(A,B,C)}$ = Total mass of mercury collected separately in Fraction 3A, 3B, or 3C, μg .

$Q_{bh3(A,B,C)}$ = Quantity of mercury in separately analyzed samples, μg .

$V_{B(A,B,C)}$ = Volume of Fraction 3A, 3B, or 3C analyzed, ml (see note in Sections 8.5.1 and 8.5.2, and calculate similarly).

$V_{soln,3(A,B,C)}$ = Total volume of Fraction 3A, 3B, or 3C, ml.

$$Hg_{bh} = Hg_{bh2} + Hg_{bh3A} + Hg_{bh3B} + Hg_{bh3C} \quad \text{Eq. 29-7}$$

where:

Hg_{bh} = Total mass of mercury collected in the back-half of the sampling train, μg .

8.5.3 Total Train Mercury Catch. Calculate the total amount of mercury collected in the sampling train using Eq 29-8.

$$Hg_t = (Hg_{th} - Hg_{fbb}) + (Hg_{bb} - Hg_{bbb}) \quad \text{Eq. 29-8}$$

where:

Hg_t = Total mass of mercury collected in the sampling train, ug.

Hg_{fbb} = Blank correction value for mass of mercury detected in front-half field reagent blank, μg .

Hg_{bbb} = Blank correction value for mass of mercury detected in back-half field reagent blanks, μg .

Note: If the total of the measured blank values ($Hg_{fbb} + Hg_{bbb}$) is in the range of 0 to 6 μg , then the total may be used to correct the sample value ($Hg_{th} + Hg_{bb}$); if it exceeds 6 μg , the greater of the following two values may be used: 6 μg or 5 percent of the sample value ($Hg_{th} + Hg_{bb}$).

8.6 Metal Concentration in Stack Gas. Calculate each metal separately for the Cd, total Cr, As, Ni, Mn, Be, Cu, Pb, P, Tl, Ag, Ba, Zn, Se, Sb, and Hg concentrations in the stack gas (dry basis, adjusted to standard conditions) as follows:

$$C_s = \frac{K_s M_c}{V_{m(scd)}} \quad \text{Eq. 29-9}$$

where:

C_s = Concentration of each metal in the stack gas, mg/dscm.

$K_4 = 10^{-3} \text{ mg}/\mu\text{g}.$

M_i = Total mass of each metal collected in the sampling train, μg ; (substitute Hg_i for M_i for the mercury calculation).

$V_{m(std)}$ = Volume of gas sample as measured by the dry gas meter, corrected to dry standard conditions, dscm.

8.7 Isokinetic Variation and Acceptable Results. Same as Method 5, Sections 6.11 and 6.12, respectively.

9. Bibliography

1. Method 303F in Standard Methods for the Examination of Water Wastewater, 15th Edition, 1980. Available from the American Public Health Association, 1015 18th Street N.W., Washington, D.C. 20036.

2. EPA Methods 6010, 7000, 7041, 7060, 7131, 7421, 7470, 7740, and 7841, Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. SW-846, Third Edition. September 1988. Office of Solid Waste and Emergency Response, U. S. Environmental Protection Agency, Washington, D.C. 20460.

3. EPA Method 200.7, Code of Federal Regulations, Title 40, Part 136, Appendix C. July 1, 1987.

4. EPA Methods 1 through 5, Code of Federal Regulations, Title 40, Part 60, Appendix A, July 1, 1991.

* * * * *

APPENDIX K

CALCULATION EQUATIONS

METHOD 2
CALCULATION EQUATIONS

$$\bar{V}_s = 85.49 C_p (\sqrt{\Delta p})_{avg} \sqrt{\frac{T_{s(avg)}}{P_s M_s}}$$

$$Q_{s,d} = 60 (1 - B_{ws}) \bar{V}_s A \left(\frac{528}{T_{s(avg)}} \right) \left(\frac{P_s}{29.92} \right)$$

$$Q_a = 60 \bar{V}_s A$$

$$\dot{m}_s = \frac{4.995 Q_{s,d} G_d}{1 - B_{ws}}$$

$$RH^* = 100 (vp_{twb} - 0.0003641 P_s (T_{db} - T_{wb})) / vp_{tdb}$$

$$B_{ws}^* = RH(vp_{tdb}) / P_s$$

$$\rho = \frac{4.585 \times 10^{-2} P_s M_s}{T_s (avg)}$$

*Alternate equations for calculating moisture content from wet bulb and dry bulb data.

SYMBOLS

A	=	Cross Sectional area of stack, SQ. FT.
A_n	=	Cross sectional area of nozzle, SQ. FT.
B_{ws}	=	Water vapor in gas stream, proportion by volume
C_p	=	Pitot tube coefficient, dimensionless
C_s	=	Concentration of particulate matter in stack gas, wet basis, GR/ACF
C_d	=	Concentration of particulate matter in stack gas, dry basis, corrected to standard conditions, GR/DSCF
EA	=	Excess air, percent by volume
γ	=	Dry test meter correction factor, dimensionless
G_d	=	Specific gravity (relative to air), dimensionless
I	=	Isokinetic variation, percent by volume
M_d	=	Molecular weight of stack gas, dry basis, g/g - mole.
m_s	=	Mass flow of wet flue gas, LB/HR
m_p	=	Particulate mass flow, LB/HR
M_i	=	Molecular weight of stack gas, wet basis, g/g mole.
M_p	=	Total amount of particulate matter collected, g
P_{bar}	=	Atmospheric pressure, IN. HG. (uncompensated)
P_s	=	Stack static gas pressure, IN. WC.
P_a	=	Absolute pressure of stack gas, IN. HG.
P_{std}	=	Standard absolute pressure, 29.92 IN. HG.
A_s	=	Actual volumetric stack gas flow rate, ACFM
$Q_{s,d}$	=	Dry volumetric stack gas flow rate corrected to standard conditions, DSCFM
RH	=	Relative humidity, %

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T_{db}	=	Dry bulb temperature of stack gas, °F
T_{wb}	=	Wet bulb temperature of stack gas, °F
$T_{m(avg)}$	=	Absolute average dry gas meter temperature, °R
$T_{s(avg)}$	=	Absolute average stack temperature, °R
T_{std}	=	Standard absolute temperature, 528 °R (68 °F)
θ	=	Total sampling time, min.
V_{lc}	=	Total volume of liquid collected in impingers and silica gel, ml
V_m	=	Volume of gas sample as measured by dry gas meter, CF
$V_{m(std)}$	=	Volume of gas sample measured by the dry gas meter corrected to standard conditions, DSCF
$V_{w(std)}$	=	Volume of water vapor in the gas sample corrected to standard conditions, SCF
$\bar{V}_s$	=	Average actual stack gas velocity, FT/SEC
vp_{fdb}	=	Vapor pressure at T_{db} , IN. HG.
vp_{fwb}	=	Vapor pressure at T_{wb} , IN. HG.
$\overline{\Delta H}$	=	Average pressure differential across the orifice meter, IN. WC.
ΔP	=	Velocity pressure of stack gas, IN. WC.
γ	=	Dry test meter correction coefficient, dimensionless
ρ	=	Actual gas density, LB/ACF

METHOD 3
CALCULATION EQUATIONS

$$\%EA = \frac{100(\%O_2 - 0.5\% CO)}{0.264\% N_2 - \%O_2 + 0.5\% CO}$$

$$M_d = 0.44(\%CO_2) + 0.32 (\%O_2) + 0.28 (\%N_2 + \%CO)$$

$$M_s = M_d (I - B_{ws}) + 0.18 B_{ws}$$

$$B_{ws} = \frac{V_{w(std)}}{V_{w(std)} + V_{m(std)}}$$

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METHOD 5
CALCULATION EQUATIONS

$$V_{m(std)} = 17.65 V_m \gamma \left(\frac{P_{bar} + \overline{\Delta H}/13.6}{T_{m(avg)}} \right)$$

$$V_{w(std)} = 0.0472 V_{ls}$$

$$B_{ws} = \frac{V_{w(std)}}{V_{w(std)} + V_{m(std)}}$$

$$I = 0.0944 \left(\frac{T_{s(avg)} V_{m(std)}}{P_s V_s A_n \theta (I - B_{ws})} \right)$$

$$C_s = \frac{15.43 M_p}{V_{m(std)}}$$

$$C_a = \frac{272.3 M_p P_s}{T_{s(avg)} (V_{w(std)} + V_{m(std)})}$$

$$(\dot{m}_p)_1 = 8.5714 \times 10^{-3} C_s Q_{s,d}$$

$$(\dot{m}_p)_2 = \frac{1.3228 \times 10^{-1} M_p A}{\theta A_n}$$

$$\dot{m}_p = \frac{(\dot{m}_p)_1 + (\dot{m}_p)_2}{2}$$

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CALCULATION EQUATIONS

METHOD 6

$$V_{std} = 17.64 \frac{V_m P_b \gamma}{T_m} \text{ (MIDGET IMPINGER VERSION)}$$

$$V_{std} = \frac{17.64 V_m (P_b + \frac{\overline{\Delta H}}{13.6}) \gamma}{T_m} \text{ (LARGE IMPINGER VERSION)}$$

$$MEQ = (V_t - V_{tb}) N \left(\frac{V_{soln}}{V_a} \right) DF$$

$$C_s = \frac{7.06 \times 10^{-5} MEQ}{V_{std}}$$

$$E = \frac{20.90 C_s F_d}{20.90 - \bar{B}'_{O_2}} = \frac{F_c C_s}{\bar{B}'_{CO_2}}$$

$$C_s \text{ (MG/DSCM)} = 1.60186 \times 10^7 C_s$$

$$C_s \text{ (GR/DSCF)} = 7000 C_s$$

$$C_s \text{ (ppm, dry)} = 6.02119 \times 10^6 C_s$$

$$C_s \text{ (ppm, wet)} = 6.02119 \times 10^6 C_s \left(1 - \frac{MC}{100} \right)$$

SYMBOLS

$\bar{B} \text{ O}_2$	=	Average oxygen content in flue gas, % v/v, dry
$\bar{B} \text{ CO}_2$	=	Average carbon dioxide content in flue gas, % v/v, dry
C_s	=	Concentration of sulfur dioxide in flue gas, dry basis, corrected to standard conditions, LB/DSCF
$C_s \text{ (GR/DSCF)}$	=	Concentration of sulfur dioxide in flue gas, dry basis, corrected to standard conditions, GR/DSCF
$C_s \text{ (MG/DSCM)}$	=	Concentration of sulfur dioxide in flue gas, dry basis, corrected to standard conditions, MG/DSCM
DF	=	Dilution Factor
E	=	Emission factor, LB of SO_2 /10 ⁶ BTU
F _d	=	Dry oxygen F-Factor for given fuel type, DSCF/10 ⁶ BTU
F _c	=	Carbon dioxide F-Factor for given fuel type, DSCF/10 ⁶ BTU
ΔH	=	Average pressure drop across calibrated orifice, IN. W.C.
Y	=	Dry test meter correction factor, dimensionless
MC	=	Moisture content of flue gas, % v/v
MEQ	=	Total milliequivalents of SO_2 in gas sample
N	=	Normality of barium perchlorate titrant
P _b	=	Barometric pressure at the dry gas meter, IN. HG.
$C_s \text{ (ppm-dry)}$	=	Concentration of sulfur dioxide in flue gas, dry basis, (v/v), ppm
$C_s \text{ (ppm-wet)}$	=	Concentration of sulfur dioxide in flue gas, wet basis, (v/v), ppm
T _m	=	Absolute average dry gas meter temperature, °R
V _s	=	Volume of sample aliquot titrated, cc
V _m	=	Dry gas volume as measured by the dry gas meter, DCF
V _{std}	=	Dry gas volume as measured by the dry gas meter, corrected to standard conditions (at 68 °F and 1 atmosphere), DSCF

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V_{soln} = Total volume of the solution in which the sulfur dioxide sample is contained, cc

V_t = Volume of barium perchlorate titrant used for the sample, cc (average of replicate titrations)

V_{tb} = Volume of barium perchlorate titrant used for the blank, cc

CALCULATION EQUATIONS

METHOD 7

$$V_{m(std)} = 17.64 (V_f - 25) \left[\frac{P_f}{T_f} - \frac{P_i}{T_i} \right]$$

$$C_s = 6.243 \times 10^{-5} \frac{M}{V_{m(std)}}$$

$$E = \frac{2090 C_s F}{20.9 - \bar{B}'_{O_2}}$$

$$C_s (GR/DSCF) = 7000 C_s$$

$$C_s (MG/DSCM) = 1.60186 \times 10^7 C_s$$

$$C_s (ppm-dry) = 8.37552 \times 10^6 C_s$$

$$C_s (ppm-3\% O_2) = 8.37552 \times 10^6 C_s \left\{ 1 + \left[\frac{\bar{B}'_{O_2} - 3}{20.9 - \bar{B}'_{O_2}} \right] \right\}$$

$$C_s (ppm-wet) = 8.37552 \times 10^6 C_s \left(1 - \frac{MC}{100} \right)$$

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SYMBOLS

$\bar{B}_{O_2}$	=	Average oxygen content in flue gas, % v/v
C_s	=	Concentration of nitrogen oxides in flue gas, dry basis, corrected to standard conditions, LB/DSCF
C_s (GR/DSCF)	=	Concentration of nitrogen oxides in flue gas, dry basis, corrected to standard conditions, GR/DSCF
C_s (MG/DSCM)	=	Concentration of nitrogen oxides in flue gas, dry basis, corrected to standard conditions, MG/DSCM
E	=	Emission factor, LB/10 ⁶ BTU
F	=	F-Factor for given fuel type, DSCF/10 ⁶ BTU
M	=	Mass of nitrogen oxides as nitrogen dioxide in gas sample, ug
MC	=	Moisture content of flue gas, %
P_f	=	Final absolute pressure in flask, IN. HG
P_i	=	Initial absolute pressure in flask, IN. HG
C_s (ppm-dry)	=	Concentration of nitrogen oxides in flue gas, dry basis, (v/v), ppm
C_s (ppm-3% O ₂)	=	Concentration of nitrogen oxides in flue gas, dry basis, corrected to 3% O ₂ , (v/v) ppm
C_s (ppm-wet)	=	Concentration of nitrogen oxides in flue gas, wet basis, (v/v), ppm
T_f	=	Final absolute temperature in flask, °R
T_i	=	Initial absolute temperature in flask, °R
V_f	=	Volume of flask and valve, cc
$V_{m(std)}$	=	Sample volume at standard conditions, dry basis, cc

CALCULATIONS FOR METALS

1. CONCENTRATION (ug/Nm³)

$$\text{ug/Nm}^3 = \frac{35.31 \text{ ft}^3}{\text{m}^3} \times \frac{\text{ug in sample}}{V_m \text{ (DSCF)}}$$

where V_m = Exhaust gas volume through meter (DSCF)

2. EMISSION RATE (lb/hr)

$$(\text{lb/hr}) = \frac{\text{ug}}{\text{Nm}^3} \times \frac{\text{lb}}{454\text{g}} \times \frac{\text{g}}{1000\text{mg}} \times \frac{\text{mg}}{1000\text{ug}} \times \frac{\text{DSCF}}{\text{min}} \times \frac{60 \text{ min}}{\text{hr}} \times \frac{0.0283 \text{ Nm}^3}{\text{DSCF}}$$

$$(\text{lb/hr}) = (3.74 \times 10^{-9}) \times \text{DSCFM} \times \frac{\text{ug}}{\text{Nm}^3}$$

where DSCFM = Volumetric flow rate in the source

APPENDIX L

SAMPLING TRAIN CALIBRATION DATA

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job Cypress North Shore
 Operator SB

Date 5-23-94
 Module No. 13

Instructions: Operate the control module at a flow rate equal to ΔH_e for 10 minutes before attaching the umbilical. Record the following data:

Bar press 29.18 in. Hg. $\tau =$ 1.0047 ΔH_e 1.93 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	176.90		
2.5	178.77	67	60
5.0	180.57	72	61
7.5	182.43	75	62
10	184.25	78	63
	$V_m = 7.35$	$Avg(t_m) = 67.25$ °F	

Calculate Y_{on} as follows:

$$Y_{on} = \frac{1.786}{\tau V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{on} = \frac{1.786}{(1.0047)(7.35)} \left[\frac{(67.25) + 460}{(29.18)} \right]^{0.5}$$

$$Y_{on} = \underline{1.0281}$$

If Y_{on} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job Cypress Northshore Mining
 Operator Bob

Date 5-24-74
 Module No. 3

Instructions: Operate the control module at a flow rate equal to ΔH for 10 minutes before attaching the umbilical. Record the following data:

Bar press 29.18 in. Hg. $\tau =$.9983 ΔH 1.80 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(605.00)		
2.5	606.94	78	73
5.0	608.89	80	74
7.5	610.83	83	76
10	612.775	85	77
	$V_m = 7.775$	Avg(t_m) = 78.25 °F	

Calculate Y_{on} as follows:

$$Y_{on} = \frac{1.786}{\tau V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{on} = \frac{1.786}{(.9983)(7.775)} \left[\frac{(78.25) + 460}{(29.18)} \right]^{0.5}$$

$$Y_{on} = \underline{.9882}$$

If Y_{on} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job CYPRUS
 Operator R. ROSENTHAL

Date 5-24-94
 Module No. 8

Instructions: Operate the control module at a flow rate equal to ΔH_0 for 10 minutes before attaching the umbilical. Record the following data:

Bar press 29.09 in. Hg. $T =$ 1.0078 ΔH_0 1.85 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(359.30)		
2.5	361.18	61	60
5.0	363.07	62	61
7.5	364.96	63	61
10	366.85	62	62
	$V_m = 7.55$	Avg(t_m) = 61.5 °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{T V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

7.609 4.234

$$Y_{cn} = \frac{1.786}{() ()} \left[\frac{() + 460}{()} \right]^{0.5}$$

$$Y_{cn} = \underline{.994}$$

If Y_{cn} is not within the range of 0.97 to 1.03, the volume metering system should be investigated before beginning.

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job Cypress
 Operator E. Thacker

Date 5-24-94
 Module No. 11

Instructions: Operate the control module at a flow rate equal to $\dot{V}_H$ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 29.18 in. Hg. $\tau =$.9980 $\dot{V}_{He}$ 1.80 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(250.00)		
2.5	251.93	77	74
5.0	253.86	78	74
7.5	255.77	80	75
10	257.68	82	75
	$V_m = 7.68$	Avg(t_m) = 76.9 °F	

Calculate Y_{on} as follows:

$$Y_{on} = \frac{1.786}{\tau V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{on} = \frac{1.786}{(.9980)(7.68)} \left[\frac{(76.9) + 460}{(29.18)} \right]^{0.5} = 4.2843$$

$$Y_{on} = \underline{.9954}$$

If Y_{on} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

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INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job Cypress / North Shore, mass
 Operator M. Knebler

Date 5-24-94
 Module No. 16

Instructions: Operate the control module at a flow rate equal to ΔH_0 for 10 minutes before attaching the umbilical. Record the following data:

Bar press 29.18 in. Hg. $T =$ 9971 ΔH_0 1.95 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(406.00)		
2.5	409.66	57	55
5.0	410.53	59	55
7.5	412.40	61	56
10	414.25	63	56
	$V_m = 7.45$	$Avg(t_m) = 57.75$ °F	

Calculate Y_{on} as follows:

$$Y_{on} = \frac{1.786}{T V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{on} = \frac{1.786}{(9971)(7.45)} \left[\frac{(57.75) + 460}{(29.18)} \right]^{0.5}$$

$$Y_{on} = \underline{1.013}$$

If Y_{on} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job Cypress / North Shore, MA
 Operator M. Kupler

Date 5-24-94
 Module No. 16

Instructions: Operate the control module at a flow rate equal to ΔH_0 for 10 minutes before attaching the umbilical. Record the following data:

Bar press _____ in. Hg. τ = _____ ΔH_0 _____ in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
_____	()	_____	
2.5			
5.0			
7.5			
10			
_____	$V_m =$	Avg(t_m) = _____ °F	

Refer to Runs 1-3 Test No. 1

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{\tau V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{()()} \left[\frac{() + 460}{()} \right]^{0.5}$$

$Y_{cn} =$ _____

If Y_{cn} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

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INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job NORTHSIDE MINING

Date 5-24-94

Operator E. TROWBRIDGE

Module No. 19

Instructions: Operate the control module at a flow rate equal to ΔH_e for 10 minutes before attaching the umbilical. Record the following data:

Bar press 29.18 in. Hg. $\tau =$.9925 ΔH_e 1.83 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(472.00)		
2.5	473.84	62	55
5.0	475.73	64	54
7.5	477.52	67	54
10	478.50	68	54
	$V_m = 7.50$	Avg(t_m) = 59.8 °F	

Calculate Y_{on} as follows:

$$Y_{on} = \frac{1.786}{\tau V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{on} = \frac{1.786}{(7.50)(.9925)} \left[\frac{(59.8) + 460}{(29.18)} \right]^{0.5} = 1.2206$$

$$Y_{on} = \underline{1.0124}$$

If Y_{on} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job Cyprus
 Operator D Van Haeve

Date 5/25/95
 Module No. 3

Instructions: Operate the control module at a flow rate equal to $\dot{V}_{He}$ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.92 in. Hg. $\tau =$.9983 $\dot{V}_{He}$ 1.80 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(759.30)		
2.5	761.26	70	68
5.0	763.19	72	68
7.5	765.13	74	69
10	767.04	76	70
	$V_m = 7.74$	Avg(t_m) = 70.88 °F	

Calculate Y_{on} as follows:

$$Y_{on} = \frac{1.786}{\tau V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{on} = \frac{1.786}{(.9983)(7.74)} \left[\frac{(70.88) + 460}{(28.92)} \right]^{0.5}$$

$$Y_{on} = \underline{.99}$$

If Y_{on} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

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INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job CYPRUS
 Operator RON ROSENTHAL

Date 5-25-94
 Module No. 8

Instructions: Operate the control module at a flow rate equal to ΔH for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.80 in. Hg. $\tau =$ 1.0078 ΔH 1.85 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(483.50)		
2.5	485.41	68	67
5.0	487.32	70	67
7.5	489.24	72	68
10	491.14	73	69
	$V_m = 7.64$	Avg (t _m) = 69.25 °F	

Calculate Y_{on} as follows:

.75 cfm
 7.5 cfm

$$Y_{on} = \frac{1.786}{Y V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

7.699 4.287

.2319 *

$$Y_{on} = \frac{1.786}{() ()} \left[\frac{() + 460}{()} \right]^{0.5}$$

$Y_{on} =$.994 1.0000

If Y_{on} is not within the range of 0.97 to 1.03, the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

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INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job Cyprus

Date 5-25-54

Operator E. T. Smith

Module No. 11

Instructions: Operate the control module at a flow rate equal to ΔH_0 for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.92 in. Hg. $\tau =$.4480 ΔH_0 1.80 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(420.00)		
2.5	421.92	86	82
5.0	423.85	87	81
7.5	425.74	88	81
10	427.42	88	81
	$V_m = 7.62$	$Avg(t_m) = 84.3$ °F	

Calculate Y_{cn} as follows:

$$Y_{cn} = \frac{1.786}{\tau V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{cn} = \frac{1.786}{() ()} \left[\frac{(84.3) + 460}{(28.92)} \right]^{0.5} = 4.3381$$

$$Y_{cn} = \underline{1.0188}$$

If Y_{cn} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job Cypress North Shore Mining
 Operator SB

Date 5-25-94
 Module No. 14

Instructions: Operate the control module at a flow rate equal to ΔH_e for 10 minutes before attaching the umbilical. Record the following data:

Bar press 29.18 in. Hg. $T =$ 1.0066 ΔH_e 1.85 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(50.10)		
2.5	52.02	66	65
5.0	53.91	68	65
7.5	55.82	70	65
10	57.72	71	65
	$V_m = 7.62$	$Avg(t_m) = 66.88$ °F	

Calculate Y_{on} as follows:

$$Y_{on} = \frac{1.786}{T V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{on} = \frac{1.786}{(1.0066)(7.62)} \left[\frac{(66.88) + 460}{(29.18)} \right]^{0.5}$$

$$Y_{on} = \underline{.9894}$$

If Y_{on} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job Cypress / Silver Bag, M.V.

Date 5-25-94

Operator M. Koehler

Module No. 16

Instructions: Operate the control module at a flow rate equal to $\dot{V}_0$ for 10 minutes before attaching the umbilical. Record the following data:

Bar press 28.92 in. Hg. $\tau =$.9971 $\dot{V}_0$ 1.95 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(676.00)		
2.5	677.85	58	55
5.0	679.72	60	55
7.5	681.58	63	56
10	683.47	66	56
	$V_m = 7.47$	Avg(t_m) = 58.625 °F	

Calculate Y_{on} as follows:

$$Y_{on} = \frac{1.786}{\tau V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{on} = \frac{1.786}{(.9971)(7.47)} \left[\frac{(58.625) + 460}{(28.92)} \right]^{0.5}$$

$$Y_{on} = \underline{1.015}$$

If Y_{on} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job Cypress / Silver River, Ariz

Date 5-25-84

Operator Mark Bachler

Module No. 16

Instructions: Operate the control module at a flow rate equal to ΔH_e for 10 minutes before attaching the umbilical. Record the following data:

Bar press _____ in. Hg. τ = _____ ΔH_e _____ in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
_____	()	_____	
2.5			
5.0			
7.5			
10			
_____	$V_m =$	Avg(t_m) = _____ °F	

Refer to Test 8 for meter cal

Calculate Y_{on} as follows:

$$Y_{on} = \frac{1.786}{\tau V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{on} = \frac{1.786}{()()} \left[\frac{() + 460}{()} \right]^{0.5}$$

$Y_{on} =$ _____

If Y_{on} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job Cyprus
 Operator R. Rosenthal

Date 5-26-94
 Module No. 8

Instructions: Operate the control module at a flow rate equal to ΔH_e for 10 minutes before attaching the umbilical. Record the following data:

Bar press 29.46 in. Hg. $\tau =$ 1.0078 ΔH_e 1.85 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	675.701		
2.5	677.58	56	36
5.0	679.45	58	38
7.5	681.21	59	38
10	683.17	60	39
	$V_m = 7.47$	Avg(t_m) = 48 °F	

Calculate Y_{on} as follows:

$$Y_{on} = \frac{1.786}{\tau V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

7.528

.2372

$$Y_{on} = \frac{1.786}{() ()} \left[\frac{() + 460}{()} \right]^{0.5}$$

$Y_{on} =$.985

If Y_{on} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

INTERPOLL LABORATORIES
EPA Method 5 Gas Metering System
Quality Control Check Data Sheet

Job Cypress / Silver Bay, CA

Date 5-26-94

Operator Mark Kachler

Module No. 11

Instructions: Operate the control module at a flow rate equal to ΔH_0 for 10 minutes before attaching the umbilical. Record the following data:

Bar press 29.46 in. Hg. $\tau =$ 1.786 ΔH_0 1.80 in. W.C.

Time (min)	Volume (CF)	Meter Temp. (°F)	
		Inlet	Outlet
	(717.80)		
2.5	719.65	69	67
5.0	721.50	72	68
7.5	723.37	76	68
10	725.22	79	69
	$V_m =$	$Avg(t_m) =$	°F

Calculate Y_{on} as follows:

$$Y_{on} = \frac{1.786}{\tau V_m} \left[\frac{(t_m + 460)}{P_b} \right]^{0.5}$$

$$Y_{on} = \frac{1.786}{() ()} \left[\frac{() + 460}{()} \right]^{0.5}$$

$$Y_{on} = \underline{\hspace{2cm}}$$

If Y_{on} is not within the range of 0.97 to 1.03, "the volume metering system should be investigated before beginning."

CFR Title 40, Part 60, Appendix A, Method 5, Section 4.4.1

S-432

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: June 3, 1994

Meter Box No. : 3 (Rockwell Dry Test Meter Serial No. 949231)

Date of Last Calibration: April 21, 1994
Calibration Technician: E. Trowbridge
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
April 26, 1994	4-2738	322.70	421.10	98.4	98.4
May 24, 1994	4-2971	458.20	933.28	475.08	573.48

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-620

Meter Box Calibration and Usage Status

Date of Report: June 3, 1994

Meter Box No. : 8 (Rockwell Dry Test Meter Serial No. 964547)

Date of Last Calibration: February 10, 1994

Calibration Technician: E. Trowbridge

Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
February 25, 1994	4-2376	963.00	1096.95	133.95	133.95
March 15, 1994	4-2436	1106.80	1515.39	408.59	542.54
May 03, 1994	4-2796	1515.90	2206.08	690.18	1232.72
May 06, 1994	4-2802	2215.60	2358.32	142.72	1375.44
May 24, 1994	4-2971	2366.90	2940.32	573.42	1948.86

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: June 3, 1994

Meter Box No. : 11 (Rockwell Dry Test Meter Serial No. 1334114)

Date of Last Calibration: January 11, 1994
Calibration Technician: E. Trowbridge
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
March 23, 1994	4-2518	93.60	224.90	131.30	131.30
May 24, 1994	4-2971	263.20	879.76	616.56	747.86

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: June 3, 1994

Meter Box No. : 13 (Rockwell Dry Test Meter Serial No. 1334120)

Date of Last Calibration: January 12, 1994

Calibration Technician: E. Trowbridge

Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter		Final Meter		Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
		Reading		Reading			
January 26, 1994	4-2164	38.50		386.51		348.01	348.01
February 25, 1994	4-2376	427.70		521.39		93.69	441.70
March 24, 1994	4-2519	531.10		636.83		105.73	547.43
May 12, 1994	4-2841	653.95		1121.26		467.31	1014.74
May 17, 1994	4-2874	1130.75		1175.90		45.20	1059.94
May 24, 1994	4-2971	1184.40		1240.87		56.47	1116.41

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: June 3, 1994

Meter Box No. : 14 (Rockwell Dry Test Meter Serial No. 1334119)

Date of Last Calibration: April 25, 1994
Calibration Technician: E. Trowbridge
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
April 29, 1994	4-2743	373.45	477.56	104.11	104.11
May 03, 1994	4-2801	486.40	703.12	216.72	320.83
May 05, 1994	4-2800	711.35	953.51	242.16	562.99
May 24, 1994	4-2971	953.75	1291.90	338.15	901.14

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: June 3, 1994

Meter Box No. : 16 (Rockwell Dry Test Meter Serial No. 1334115)

Date of Last Calibration: April 8, 1994
Calibration Technician: Ed Trowbridge
Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
May 12, 1994	4-2870	969.10	1083.43	114.33	114.33
May 17, 1994	4-2888	1094.00	1228.25	134.25	248.58
May 18, 1994	4-2889	1281.90	1406.45	124.55	373.13
May 24, 1994	4-2971	1414.40	1988.00	573.60	946.73

* Total volume through meter since last calibration.

Interpoll Laboratories, Inc.
(612) 786-6020

Meter Box Calibration and Usage Status

Date of Report: June 3, 1994

Meter Box No. : 19 (Rockwell Dry Test Meter Serial No. 1334118)

Date of Last Calibration: April 22, 1994

Calibration Technician: E. Trowbridge

Wet Test Meter No.: American Meter AL-20

Date of Use	Report No.	Initial Meter Reading	Final Meter Reading	Volume/Job (cu. ft.)	Total Volume* (cu. ft.)
May 24, 1994	4-2971	479.50	622.40	142.90	142.90

* Total volume through meter since last calibration.

Bar. Press. 29.32 in. Hg

INTERPOL LABORATORIES, INC.
METER CALIBRATION SHEET

Control Module No. 2

Serial No. DIM 949231

Net Test Water No. AL-20

Technician

[illegible]

Positive leak check performed by 667
 Water was in tolerance ☒
 Water was not in tolerance ☐; readjusted linkage
 Water was not in tolerance ☐; changed dry test meters

Approved by Harvingthorpe Date 4/27/94

- Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

50102RR 11/91

**INTERPOL LABORATORIES, INC.
METER CALIBRATION SHEET**

Bar. Press. 29.10 In. Hg

Control Module No. 8
Serial No. DTM 964 547
Met Test Mater No. AL-20
Technician W. H. H. H. H.

[illegible]

Positive leak check performed by
 Meter was in tolerance ☒
 Meter was not in tolerance ☐; readjusted linkage
 Meter was not in tolerance ☐; changed dry test meter's

Approved by Samuel A. Carr Date 2/14/64

* Based on: AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

Control Module No. //

133HS NOI/NTVTS YELER METER CALIBRATION SHEET

EPA METHOD 5

Hot Test Water No, AL-20

Technician

[illegible]

Positive leak check performed by _____

Water was in tolerance ☒

Water was not in tolerance ☐; readjusted linkage

Water was not in tolerance ☐; changed dry test meters

Approved by Donald R. [Signature] Date 1/14/84

Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe-Co.

S0102RR 11/91

Bar. Press. 24.02 In: Hg

INTERPOL LABORATORIES, INC.
METER CALIBRATION SHEET

EPA METHOD 8

Control Module No. 13

Serial No. DTM / 334/20

Wet Test Meter No. AL-20

Technician

[illegible]

Positive leak check performed by
 Water was in tolerance ☒
 Water was not in tolerance ☐; readjusted linkage
 Water was not in tolerance ☐; changed dry test meters

Approved by Samuel R. Day Date 11/14/94

* Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

4-25-94

78.66

**INTERPOL LABORATORIES, INC.
METER CALIBRATION SHEET
EPA METHOD 5**

Control Module No. 14
Serial No. DTM 1334118
Net Test Meter No. AL-20
Technician W. J. Anderson

[illegible]

Positive leak check performed by ET
 Meter was in tolerance ☒
 Meter was not in tolerance ☐; readjusted linkage
 Meter was not in tolerance ☐; changed dry test meters

Approved by Denise L. Per Date 5/2/94

• Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

5010288 11/91

4-8-84

78.79

INTERPOLL LABORATORIES, INC.
METER CALIBRATION SHEET

EPA METHOD 8

Control Module No.

Serial No. DIM

Water Test Meter No. AL-20

Technician

1

positive leak check performed by:

Water was in tolerance

Water was not in tolerance ☐; readjusted linkage

Water was not in tolerance ☒; changed dry test meters

Approved by:

Erin H. Brown 2/18/94

Nov 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

Bar. Press. 29.3 in. Hg

INTERPOL LABORATORIES, INC.
METER CALIBRATION SHEET

9 DOMESTIC VIOLENCE

Control Module No. _____

Serial No. DIM

Lab Test Water No. AL-20

Technician

[illegible]

Positive leak check performed by
Water was in tolerance ☒

Water was not in tolerance ☒: readjust linkage

Water was not in tolerance ☒; changed dry test meters

Approved by Kenneth A. Kelly Date 5/2/94

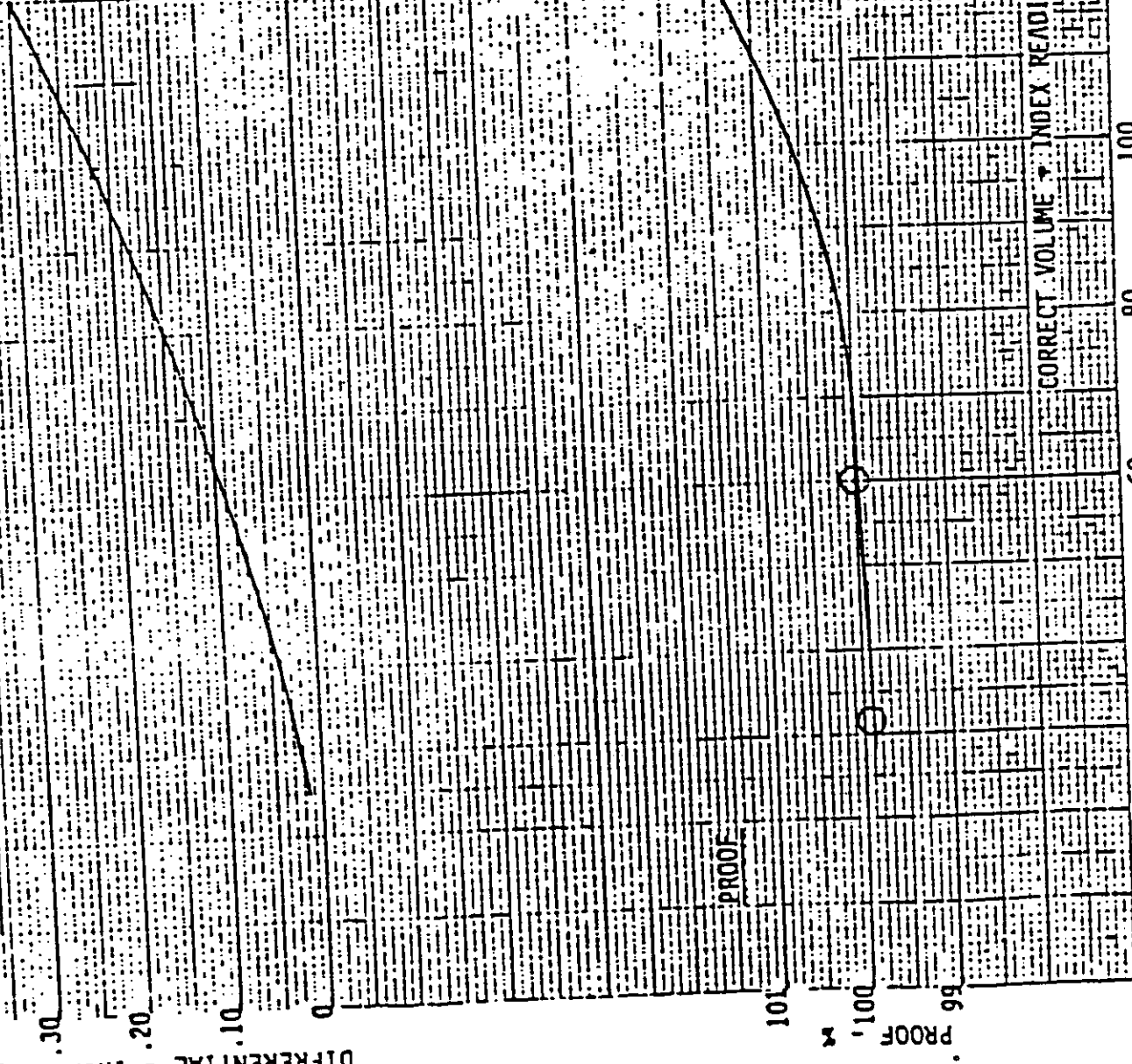
* Based on AL-20 wet test meter calibration in Nov. 1991 against Bell Prover (NBS Traceable) - Carl Poe Co.

5010288 11/91

DIFFERENTIAL INCHES H2O

DIFFERENTIAL PRESSURE AND FLOW
WET TEST METER

PULSATION RANGE



Calibrated with a 10 Ft. American Bell
Prover, Serial No. 3157. Traceable to
the Bureau of Standards. Reference No.
5249068, PI-TAPE.

AL-20 American Wet Test Meter
Serial No. P-717
Stainless Steel w/Removable Back
Calibrated w/Saturated Air
Water Temp. 74° F.
Air Temp. 74° F.
Inlet Pressure 2" H2O Constant
Calibration Rate: 60 CFH Per/Hr.
Capacity Rate: 120 CFH Per/Hr.
Restricted Outlet for Rate Deviation

DAVID BANKS

FLOW RATE - CUBIC FEET OF AIR PER HOUR

20

40

60

80

100

120

November 1991

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 05-24-94

Nozzle Number 4-3

Technician: Scott Bainville

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.185
2	.185
3	.184
Average:	.185

Interpoll Laboratories, Inc.

(612) 786-6020

Nozzle Calibration

Data Sheet

Date of Calibration: 05-24-94

Nozzle Number 5-3

Technician: Mark Kaehler

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.189
2	.189
3	.191
Average:	.190

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 05-24-94

Nozzle Number 7-4

Technician: Ed Trowbridge

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.249
2	.248
3	.248
Average:	.248

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 05-24-94

Nozzle Number 10-3

Technician: Ron Rosenthal

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.190
2	.189
3	.190
Average:	.190

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 05-24-94

Nozzle Number Glass

Technician: Duane Van Hoever

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.247
2	.248
3	.252
Average:	.249

Interpoll Laboratories, Inc.

(612) 786-6020

Nozzle Calibration

Data Sheet

Date of Calibration: 05-25-94

Nozzle Number 10-4

Technician: Ron Rosenthal

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.248
2	.249
3	.247
Average:	.248

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 05-26-94

Nozzle Number 6-4

Technician: Mark Kaehler

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.248
2	.248
3	.248
Average:	.248

Interpoll Laboratories, Inc.
(612) 786-6020

**Nozzle Calibration
Data Sheet**

Date of Calibration: 05-26-94
Technician: Duane Van Hoever

Nozzle Number 7-2

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.248
2	.248
3	.248
Average:	.248

Interpoll Laboratories, Inc.

(612) 786-6020

Nozzle Calibration

Data Sheet

Date of Calibration: 05-26-94

Nozzle Number Glass

Technician: Ron Rosenthal

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.229
2	.229
3	.228
Average:	.229

Interpoll Laboratories, Inc.
(612) 786-6020

Nozzle Calibration
Data Sheet

Date of Calibration: 05-27-94
Technician: Duane Van Hoever

Nozzle Number 10-4

The nozzle is rotated in 60 degree increments and the diameter at each point is measured to the nearest 0.001 inch. The observed readings and average are shown below.

Position	Diameter (inches)
1	.247
2	.247
3	.248
Average:	.247

Interpoll Laboratories, Inc.

Temperature Measurement Device
Calibration Sheet

PDT # 7

Unit under test:

Vendor GORDON
 Model 5310-K Serial Number 890423276-103
 Range 0-2000 °F Thermocouple Type K
 Date of Calibration 7-26-93 Technician SL

Method of Calibration:

- ☐ Comparison against ASTM mercury in glass thermometer using a thermostatted and insulated aluminum block designed to provide uniform temperature. The temperature is adjusted by adjusting the voltage on the block heater cartridge.
- ☒ Omega Model CL-300 Type K Thermocouple Simulator which provides 22 precise temperature equivalent millivolt signals. The CL-300 is cold junction compensated. Calibration accuracy is $\pm 0.1\%$ of span (2100°F) ± 1 degree (for negative temperatures add ± 2 degrees. The CL-300 simulates exactly the millivoltage of a Type K thermocouple at the indicated temperature.

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation	
			Δt (°F)	(%)
0	0	-1.6	1.6	0.34
100	100	95.0	5.0	0.89
200	200	198	2	0.30
300	300	295	5	0.166
400	400	392	8	0.93
500	500	491	9	0.94
600	600	592	8	0.75
700	700	692	8	0.67
800	800	796	4	0.32
900	900	896	4	0.29
1000	1000	1000	0	0.00
1100	1100	1101	1	0.06
1200	1200	1205	5	0.30
1300	1300	1304	4	0.23
1400	1400	1407	7	0.38
1500	1500	1503	3	0.15
1600	1600	1602	2	0.10
1700	1700	1695	5	0.23
1800	1800	1791	9	0.37
1900	1900	1882	18	0.76
2000				
2100				
Averages:			5.4	0.43

OF = off scale response by unit under test (°F)
 $\% \text{ dev} = 100 \Delta t / (460 + t)$

- ☒ Unit in tolerance
☐ Unit was not in tolerance: recalibrated - See new calibration sheet.

Interpoll Laboratories, Inc.

Temperature Measurement Device
Calibration Sheet

Unit under test:

Vendor BECKMAN #28
Model HD 110 T Serial Number 920521132
Range 0-1900 °F Thermocouple Type K
Date of Calibration 2-11-94 Technician E TROUBLED

Method of Calibration:

- ☐ Comparison against ASTM mercury in glass thermometer using a thermostatted and insulated aluminum block designed to provide uniform temperature. The temperature is adjusted by adjusting the voltage on the block heater cartridge.
- ☒ Omega Model CL-300 Type K Thermocouple Simulator which provides 22 precise temperature equivalent millivolt signals. The CL-300 is cold junction compensated. Calibration accuracy is $\pm 0.1\%$ of span (2100 °F) ± 1 degree (for negative temperatures add ± 2 degrees. The CL-300 simulates exactly the millivoltage of a Type K thermocouple at the indicated temperature.

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation	
			Δt (°F)	(%)
0	0	0	0	0
100	100	97	3	.53
200	200	201	1	.15
300	300	299	1	.13
400	400	396	4	.46
500	500	495	5	.52
600	600	598	2	.18
700	700	699	1	.08
800	800	604	4	.31
900	900	900	0	.44
1000	1000	1011	11	.75
1100	1100	1114	14	.89
1200	1200	1221	21	1.26
1300	1300	1321	21	1.19
1400	1400	1425	25	1.34
1500	1500	1523	23	1.17
1600	1600	1625	25	1.21
1700	1700	1720	20	.92
1800	1800	1818	18	.74
1900	1900	1911	11	.46
2000	2000			
2100	2100			
Averages:			10.8	.57

OF = off scale response by unit under test (°F)
% dev = $100 \Delta t / (460 + t)$



Unit in tolerance
Unit was not in tolerance; recalibrated - See new calibration sheet.

Interpoll Laboratories, Inc.

Temperature Measurement Device
Calibration Sheet

Unit under test:

Vendor OMEGA PDT-29
 Model HH21 Serial Number T-97106
 Range 0-2100 °F Thermocouple Type K
 Date of Calibration 10-14-93 Technician SLB

Method of Calibration:

- ☐ Comparison against ASTM mercury in glass thermometer using a thermostatted and insulated aluminum block designed to provide uniform temperature. The temperature is adjusted by adjusting the voltage on the block heater cartridge.
- ☒ Omega Model CL-300 Type K Thermocouple Simulator which provides 22 precise temperature equivalent millivolt signals. The CL-300 is cold junction compensated. Calibration accuracy is $\pm 0.1\%$ of span (2100°F) ± 1 degree (for negative temperatures add ± 2 degrees). The CL-300 simulates exactly the millivoltage of a Type K thermocouple at the indicated temperature.

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation	
			Δt (°F)	(%)
0	0	-0.7	0.7	0.00
100	100	98.6	1.4	0.01
200	200	200.1	0.6	0.00
300	300	299.8	1.2	0.10
400	400	398.1	1.9	0.19
500	500	496.8	1.2	0.13
600	600	600.7	0.7	0.01
700	700	698.8	1.1	0.09
800	800	800.9	0.9	0.07
900	900	898.9	1.1	0.08
1000	1000	999.8	0.1	0.01
1100	1100	1099.5	1.4	0.09
1200	1200	1201.0	1.0	0.06
1300	1300	1298.7	1.3	0.07
1400	1400	1401.1	1.1	0.05
1500	1500	1499.4	1.6	0.05
1600	1600	1599.8	0.2	0.01
1700	1700	1697.8	2.2	0.10
1800	1800	1799.7	0.3	0.01
1900	1900	1897.0	3.0	0.13
2000	2000	1998.6	1.4	0.06
2100	2100	2097.0	3.0	0.12
		Averages:	1.22	0.09

OF = off scale response by unit under test (°F)
 $\% \text{ dev} = 100 \Delta t / (460 + t)$

- ☐ Unit in tolerance
☐ Unit was not in tolerance: recalibrated - See new calibration sheet.

Interpoll Laboratories, Inc.

Temperature Measurement Device
Calibration Sheet

Unit under test:

Vendor WAVETEK
Model HD110T
Range 0° - 1900° °F
Date of Calibration 1-7-94
Serial Number 931123044 (#30)
Thermocouple Type K
Technician SB

Method of Calibration:

- ☐ Comparison against ASTM mercury in glass thermometer using a thermostatted and insulated aluminum block designed to provide uniform temperature. The temperature is adjusted by adjusting the voltage on the block heater cartridge.
- ☒ Omega Model CL-300 Type K Thermocouple Simulator which provides 22 precise temperature equivalent millivolt signals. The CL-300 is cold junction compensated. Calibration accuracy is $\pm 0.1\%$ of span (2100 °F) ± 1 degree (for negative temperatures add ± 2 degrees. The CL-300 simulates exactly the millivoltage of a Type K thermocouple at the indicated temperature.

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation	
			Δt (°F)	(%)
0	0	-3	3	0.65
100	100	93	7	1.25
200	200	196	4	0.61
300	300	294	6	0.79
400	400	292	8	0.93
500	500	491	9	0.94
600	600	594	6	0.57
700	700	694	6	0.52
800	800	799	1	0.08
900	900	901	1	0.02
1000	1000	1007	7	0.48
1100	1100	1110	10	0.64
1200	1200	1216	16	0.94
1300	1300	1317	17	0.97
1400	1400	1421	21	1.13
1500	1500	1519	19	0.97
1600	1600	1620	20	0.97
1700	1700	1715	15	0.69
1800	1800	1814	14	0.62
1900	1900	1906	6	0.25
2000	OF	OF	—	—
2100	OF	OF	—	—
Averages:			10.25	0.70

OF = off scale response by unit under test (°F)
% dev = $100 \Delta t / (460 + t)$



Interpoll Laboratories, Inc.

Temperature Measurement Device
Calibration Sheet

E.T.'s

Unit under test:

Vendor OMEGA # 34
Model HHS1 Serial Number 747X6343
Range 0-2000 °F Thermocouple Type K
Date of Calibration 4-21-94 Technician E. TROUBLEDAP

Method of Calibration:

- ☐ Comparison against ASTM mercury in glass thermometer using a thermostatted and insulated aluminum block designed to provide uniform temperature. The temperature is adjusted by adjusting the voltage on the block heater cartridge.
- ☒ Omega Model CL-300 Type K Thermocouple Simulator which provides 22 precise temperature equivalent millivolt signals. The CL-300 is cold junction compensated. Calibration accuracy is $\pm 0.1\%$ of span (2100 °F) ± 1 degree (for negative temperatures add ± 2 degrees. The CL-300 simulates exactly the millivoltage of a Type K thermocouple at the indicated temperature.

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation	
			Δt (°F)	(%)
0	0	-1.9	-1.9	.41
100	100	-97.5	-2.5	.45
200	200	199.7	.3	.05
300	300	297.5	-2.5	.33
400	400	397	-3	.35
500	500	498	-2	.20
600	600	600	—	.0
700	700	699	-1	.08
800	800	801	+1	.08
900	900	900	—	.0
1000	1000	1001	+1	.07
1100	1100	1098	-2	.13
1200	1200	1201	+1	.06
1300	1300	1299	-1	.05
1400	1400	1402	+2	.11
1500	1500	1500	—	.0
1600	1600	1603	+3	.14
1700	1700	1701	+1	.05
1800	1800	1804	+4	.18
1900	1900	1901	+1	.04
2000	2000	2001	+1	.04
2100	2100	2099	-1	—
		Averages:	1.46	.128

OF = off scale response by unit under test (°F)
% dev = $100 \Delta t / (460 + t)$

- ☒ Unit in tolerance
☐ Unit was not in tolerance; recalibrated - See new calibration sheet.

Interpoll Laboratories, Inc.

Temperature Measurement Device
Calibration Sheet

Unit under test:

Vendor dim 247 # 35
Model HHSI Serial Number 74JX0332
Range 0 - 2100 °F Thermocouple Type K
Date of Calibration 7-21-94 Technician E. ZROUBIDAP

Method of Calibration:

- ☐ Comparison against ASTM mercury in glass thermometer using a thermostatted and insulated aluminum block designed to provide uniform temperature. The temperature is adjusted by adjusting the voltage on the block heater cartridge.
- ☒ Omega Model CL-300 Type K Thermocouple Simulator which provides 22 precise temperature equivalent millivolt signals. The CL-300 is cold junction compensated. Calibration accuracy is $\pm 0.1\%$ of span (2100 °F) ± 1 degree (for negative temperatures add ± 2 degrees. The CL-300 simulates exactly the millivoltage of a Type K thermocouple at the indicated temperature.

Desired Temp (°F) Nominal	Temperature of Standard or Simulated Temp (°F)	Response of Unit Under Test (°F)	Deviation	
			Δt (°F)	(%)
0	0	-3	-3	.65
100	100	98	-2	.35
200	200	200	0	0
300	300	298	-2	.30
400	400	398	-2	.23
500	500	499	-1	.10
600	600	601	+1	.09
700	700	699	-1	.09
800	800	801	+1	.08
900	900	900	0	0
1000	1000	1001	+1	.07
1100	1100	1100	0	0
1200	1200	1201	+1	.06
1300	1300	1299	-1	.05
1400	1400	1402	+2	.11
1500	1500	1501	+1	.05
1600	1600	1604	+4	.19
1700	1700	1701	+1	.05
1800	1800	1804	+4	.18
1900	1900	1901	+1	.04
2000	2000	2001	+1	.04
2100	2100	2099	-1	.04
Averages:			1.40	.123

OF = off scale response by unit under test (°F)
% dev = $100 \Delta t / (460 + t)$

- ☒ Unit in tolerance
☐ Unit was not in tolerance; recalibrated - See new calibration sheet.

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 22 - 2 1/2

Pitot tube dimensions:

1. External tubing diameter (D) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z < .125" .02
9. W < .0625" .02

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .760 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

- ☒ Meets all EPA design criteria thus $C_p = 0.84$
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
 $C_p =$ _____

Date of Inspection:

4-8-94

Inspected by:

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 22-5

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0

6. B_1 < 5° 0
7. B_2 < 5° 0

8. Z < .125" .02
9. W < .0625" .02

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

- ☒ Meets all EPA design criteria thus $C_p = 0.84$
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
 $C_p =$ _____

Date of Inspection:

4-8-94

Inspected by:

[Signature]

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 22-6

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 $< 10^\circ$ 0
5. α_2 $< 10^\circ$ 0
6. B_1 $< 5^\circ$ 0
7. B_2 $< 5^\circ$ 0
8. Z $< .125"$.02
9. W $< .0625"$.02

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

- ☒ Meets all EPA design criteria thus $C_p = 0.84$
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
 $C_p =$ _____

Date of Inspection:

4-8-84

Inspected by:

[Signature]

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 23-4

Pitot tube dimensions:

1. External tubing diameter (D_t) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0
6. B_1 < 5° 0
7. B_2 < 5° 0
8. Z < .125" .0
9. W < .0625" .02

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .758 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

- ☒ Meets all EPA design criteria thus $C_p = 0.84$
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
 $C_p =$ _____

Date of Inspection:

4-8-84

Inspected by:

[Signature]

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 23-6

Pitot tube dimensions:

1. External tubing diameter (D) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0
6. β_1 < 5° 0
7. β_2 < 5° 0
8. Z < .125" .02
9. W < .0625" .025

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

- ☒ Meets all EPA design criteria thus $C_p = 0.84$
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
 $C_p =$ _____

Date of Inspection:

4-8-94

Inspected by:

[Signature]

Interpoll Laboratories, Inc.
(612) 786-6020

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 27-8

Pitot tube dimensions:

1. External tubing diameter (D) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0
6. B₁ < 5° 0
7. B₂ < 5° 0
8. Z < .125" 0
9. W < .0625" .01

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

- ☒ Meets all EPA design criteria thus C_p = 0.84
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
C_p = _____

Date of Inspection:

4-7-94

Inspected by:

E. J. Rowland

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. 27-10

Pitot tube dimensions:

1. External tubing diameter (D) .316 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 < 10° 0
5. α_2 < 10° 0
6. B_1 < 5° 0
7. B_2 < 5° 0
8. Z < .125" .02
9. W < .0625" .01

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

- ☒ Meets all EPA design criteria thus $C_p = 0.84$
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
 $C_p =$ _____

Date of Inspection:

4-7-94

Inspected by:

[Signature]

S-Type Pitot Tube Inspection Sheet

Pitot Tube No. MM-6

Pitot tube dimensions:

1. External tubing diameter (D_t) .516 IN.
2. Base to Side A opening plane (P_A) .460 IN.
3. Base to Side B opening plane (P_B) .460 IN.

Alignment:

4. α_1 $< 10^\circ$ 0
5. α_2 $< 10^\circ$ 0

6. B_1 $< 5^\circ$ 0
7. B_2 $< 5^\circ$ 0

8. Z $< .125"$.03
9. W $< .0625"$.025

Distance from Pitot to Probe Components:

10. Pitot to 0.500 IN. nozzle .750 IN.
11. Pitot to probe sheath 3.0 IN.
12. Pitot to thermocouple (parallel to probe) 3.0 IN.
13. Pitot to thermocouple (perpendicular to probe) .760 IN.

- ☒ Meets all EPA design criteria thus $C_p = 0.84$
☐ Does not meet EPA design criteria - thus calibrate in wind tunnel.
 $C_p =$ _____

Date of Inspection:

4-8-94

Inspected by:

[Signature]

INTERPOLL LABORATORIES
(612)786-6020
Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 2-18-74
Technician Bob
Mercury Column Barometer No. LAB 1
Aneroid Barometer No. 10723029

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjusted Mercury Barometer Read	Initial Aneroid Barometer Read	Difference (P _{ba} -P _{bm})
29.01	76	.125	28.885	28.83	.055

Has this barometer shown any consistent problems with calibration? Yes/No. If yes, explain. NO

Has problem been alleviated? Yes/No. How? _____

***Note**

Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20-30 minutes before calibrating. Aneroid barometer will be calibrated to the adjusted mercury barometer readings.

S-312

INTERPOLL LABORATORIES

(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 10-15-93
Technician SCOTT L BAINVILLE
Mercury Column Barometer No. 1
Aneroid Barometer No. 560209

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjusted Mercury Barometer Read	Initial Aneroid Barometer Read	Difference (P _{ba} -P _{bm})
29.10	76	.134	28.97	29.16	0.19
29.13	73	.124	29.01	29.19	0.18

Has this barometer shown any consistent problems with calibration? Yes/No. If yes, explain. NO

Has problem been alleviated? Yes/No. How? N/A

*Note

Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20-30 minutes before calibrating. Aneroid barometer will be calibrated to the adjusted mercury barometer readings.

S-312

INTERPOLL LABORATORIES
(612)786-6020
Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 9-13-93
Technician Mark Baehler
Mercury Column Barometer No. LAB-1
Aneroid Barometer No. 560815

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjusted Mercury Barometer Read	Initial Aneroid Barometer Read	Difference (P _{ba} -P _{bm})
28.770	72	.117	28.656	28.760	.104

Has this barometer shown any consistent problems with calibration? Yes/No No If
yes, explain. _____

Has problem been alleviated? Yes/No. How? _____

*Note

Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20-30 minutes before calibrating. Aneroid barometer will be calibrated to the adjusted mercury barometer readings.

S-312

INTERPOLL LABORATORIES

(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

Date 11-15-93
Technician R. ROSENTHAL
Mercury Column Barometer No. NOVA - 1
Aneroid Barometer No. _____

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjusted Mercury Barometer Read	Initial Aneroid Barometer Read	Difference (Pba-Pbm)
29.36	72	.116	29.244	29.24	0

Has this barometer shown any consistent problems with calibration? Yes/No. If yes, explain. _____

Has problem been alleviated? Yes/No. How? _____

***Note**

Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20-30 minutes before calibrating. Aneroid barometer will be calibrated to the adjusted mercury barometer readings.

S-312

INTERPOLL LABORATORIES
(612)786-6020
Stack Sampling Department - QA
Aneroid Barometer Calibration Sheet

ET'S

Date 2-31-84
Technician E. T. S.
Mercury Column Barometer No. LAB 1
Aneroid Barometer No. ultimate model 12 SN-01002008

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjusted Mercury Barometer Read	Initial Aneroid Barometer Read	Difference (P _{ba} -P _{bm})
29.230	72	.115	29.115	29.12	.005

Has this barometer shown any consistent problems with calibration? Yes/No. If yes, explain. no

Has problem been alleviated? Yes/No. How? _____

***Note**

Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20-30 minutes before calibrating. Aneroid barometer will be calibrated to the adjusted mercury barometer readings.

S-312

INTERPOLL LABORATORIES

(612)786-6020

Stack Sampling Department - QA
Aneroid Barometer Calibration SheetDate 2/14/94Technician D. Van HoeverMercury Column Barometer No. 1

Aneroid Barometer No. _____

Actual Mercury Barometer Read	Ambient Temp.	Temperature Correction Factor	Adjusted Mercury Barometer Read	Initial Aneroid Barometer Read	Difference (P _{ba} -P _{bm})
29.23	76	.124	29.114	29.10	.01

Has this barometer shown any consistent problems with calibration? Yes/No. If yes, explain. _____

Has problem been alleviated? Yes/No. How? _____

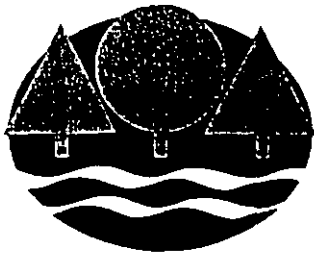
*Note

Aneroid barometers will be calibrated periodically against a mercury column barometer. The aneroid barometer to be calibrated should be placed in close proximity to the mercury barometer and left to equilibrate for 20-30 minutes before calibrating. Aneroid barometer will be calibrated to the adjusted mercury barometer readings.

S-312

APPENDIX M

TEST PLAN



Minnesota Pollution Control Agency

April 28, 1994

Mr. Dennis Wagner
Environmental Engineer
Cyprus Northshore Mining Corporation
10 Outer Drive
Silver Bay, Minnesota 56614

RE: April 4, 1994, Test Plan Submittal for the Week of May 23, 1994, Performance Testing on Sources at the Silver Bay Mine Pursuant to Air Emission Permit # 27A-89-OT-1

Dear Mr. Wagner:

This letter and its enclosures conclude the pretest requirements for the Cyprus Northshore Mining (Company) facility located in Silver Bay, Minnesota, as discussed during our pretest meeting of April 7, 1994.

The Air Quality Division (AQD) staff of the Minnesota Pollution Control Agency (MPCA) has reviewed the original submittal and the revised version, received on April 21, 1994, and has approved the test plan.

During the pretest meeting you explained that additional engineering tests would be performed. Please note that if you intend to use the results of the engineering tests for a future submittal, for example a permit action or emission inventory report, the engineering test must follow the requirements of Minn. Rules pts. 7017.2001 to 7017.2060.

Copies of the Operating Data Summary For Process Sources, Operating Data Summary For Combustion Sources, Certifications Required For Performance Test Reports, and Microfiche Submittal forms are enclosed. These forms will help you to comply with the submittal requirements of Minn. Rules pt. 7017.2035 and 7017.2040. A copy of the test plan, including this letter, must be included as part of the performance test report.

Remember that it is not the Testing Consultant's responsibility to submit the test report or microfiche copy of the test report or to certify that the microfiche submitted is an exact copy of the original test report by the deadlines specified in the applicable compliance document (i.e. permit, stipulation agreement, administrative penalty order, etc.). The responsibility for these submittals lies solely with the Company.

520 Lafayette Rd. N.; St. Paul, MN 55155-4194; (612) 296-6300 (voice); (612) 282-5332 (TTY)

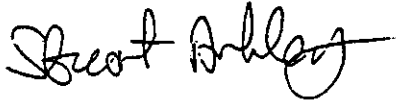
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Mr. Dennis Wagner
April 28, 1994
Page 2

If you have any questions regarding this letter or the enclosures, please call me at (612)296-7774.

Sincerely,



Stuart Arkley
Performance Test Coordinator
Compliance Determination Unit
Compliance and Enforcement Section
Air Quality Division

SA:jmd

Enclosures

cc: Robert B. Beresford, MPCA, Duluth Regional Office
Patrick F. O'Neill, AQD
AQD File No: 27A

CYPRUS NORTSHORE MINING
Stack Emission Testing
April 1994

Cyprus Northshore Mining, in order to comply with applicable permit requirements and to address certain other engineering needs, will have the following testing conducted by an independent contractor.

I. COMPLIANCE TESTING REQUIREMENTS

A. Babbitt Mine:

1. Primary Collector - Multiclone
 - a. Particulates - inlet/outlet
 - b. Opacity - outlet
2. Secondary Collector - Multiclone
 - a. Particulates - inlet/outlet
 - b. Opacity - outlet

B. Silver Bay Plant:

1. Fine Crusher - Bag House
 - a. Particulates - outlet
 - b. Opacity - outlet
2. Dry Cobber - Bag House
 - a. Particulates - outlet
 - b. Opacity - outlet
3. Bin Storage - Multiclone
 - a. Particulates - outlet
 - b. Opacity - outlet
4. Pelletizer Furnace Discharge - Rotoclone
 - a. Particulates - inlet/outlet
 - b. Opacity - outlet
5. Pelletizer Waste Gas - Wet Electrostatic Precipitators 1 inlet/2 outlets & Electrics on.
 - a. Particulates
 - b. Sulfur dioxide
 - c. Nitrogen oxides

6. Power House - Bag House
 - a. Particulates
 - b. Opacity
 - c. Sulfur dioxide
 - d. Nitrogen oxides

II. ENGINEERING TESTING REQUIREMENTS

A. Silver Bay

1. Pelletizer Waste Gas - Wet Electrostatic Precipitator 1 inlet/1 outlet
 - a. NESHAPS metals
2. Pelletizer Hood Exhaust - Wet electrostatic Precipitator 1 outlet
 - a. NESHAPS metals
3. Power House - Bag House
 - a. NESHAPS metals
4. Pelletizer Waste Gas - Wet Electrostatic Precipitator 1 inlet/1 outlet & Electrics off
 - a. Particulates
 - b. Sulfur dioxide
 - c. Nitrogen oxides
5. Pelletizer Hood Exhaust - Wet Electrostatic Precipitator 1 inlet/1 outlet with Electrics on and off.
 - a. Particulates
 - b. Opacity
 - c. Sulfur dioxide
 - d. Nitrogen oxides
6. Concurrent velocity all similar Pelletizer stacks.

All testing to be completed utilizing USEPA and/or MPCA sampling and analysis protocols.

**CYPRUS NORTSHORE MINING
E.W. Davis Works
Compliance Test Plan**

PART I. GENERAL INFORMATION

Test Plan Date: April 4, 1994

Test Date: Week of May 23, 1994

Name and Address of Emission Facility: Cyprus Northshore Mining
10 Outer Drive
Silver Bay, MN 55614

Permittee Contact: Dennis M. Wagner
(218/226-6056)

Permit File No.: 27A-89-OT-1

Independent Testing Company: Interpoll Laboratories

Contact Person: Kathy Eickstadt
(612/786-7854)

Sources to be tested:

Emission source 2:	Power Boiler #2.
Emission source 11:	Fine crusher bag house.
Emission source 22:	Dry Cobbing bag house.
Emission source 48:	Bin storage multiclones.
Emission source 76:	Pelletizing furnace discharge rotoclone.
Emission source 104-105:	Pelletizer furnace 11 waste gas WWESP.
Emission source 106-107:	Pelletizer furnace 12 waste gas WWESP.
Emission source 101:	Pelletizer furnace 12 hood exhaust WWESP.

Reason for testing: Compliance tests.

Physical descriptions of emission points: Drawings of emission control points are attached for Agency review.

PART II TESTING REQUIREMENTS

Fuel sampling and analysis for Power Boiler #2 testing. A composite sample of coal burned during the testing period will be collected. The composite sample will be prepared and analyzed on an as received basis consistent with the following American Society for Testing Materials (ASTM) methods:

Sample preparation - ASTM Method D-2013-72
Sulfur content - ASTM Method D-3177-75
Heating value - ASTM Method D-2015-77, 3286-77

Emission Source	Pollutant	Emission Limit	Applicable MN Rule	Method	Run Length
2 Power House	Particulates Matter	0.6 lb/MBTU	7005.0300 - 7005.0400	5	60 Min
	Sulfur Dioxide	2.5 lb/MBTU/Hr	•	6C	60 Min
	Opacity	20%	7005.0320 Subp. 2	9	60 Min
11 Fine Crush.	Particulate Matter	0.002 gr/dscf	7005.0010-7005.0080	5	60 Min
	Opacity	20%	7005.0470 Subp. 1.B	9	60 Min.
22 Dry Cobb	Particulate Matter	0.01 gr/dscf	7005.0010-7005.0080	5	60 Min
	Opacity	20%	7005.0470 Subp. 1.B	9	60 Min
48 Ore Bins	Particulate Matter	0.03 gr/dscf	7005.0010-7005.0080	5	60 Min
	Opacity	20%	7005.0470 Subp. 1.B	9	60 Min
76 Pell Rotoclone	Particulate Matter	0.03 gr/dscf	7005.0010-7005.0080	5	60 Min
	Opacity	20%	7005.0470 Subp. 1.B	9	60 Min
101 Pell Hood	Particulate Matter	0.01 gr/dscf	7005.0010-7005.0080	5	60 Min
	Opacity	20%	7005.0470 Subp. 1.B	9	60 Min
104 Pell Waste	Particulate Matter	0.01 gr/dscf	7005.0010-7005.0080	5	60 Min.
	Opacity	20%	7005.0470 Subp. 1.B	9	60 Min
	Sulfur Dioxide	None	-	6C	60 Min
	Nitrogen Oxides	None	-	7E	60 Min

PART III. OPERATING CONDITIONS

Emission Source 2

Process Equipment:	Steam Generator - Power Boiler #2
Process Operating Rate During Test:	50-65 Min. MW
Control Equipment:	Bag house.
Control Equipment Operating Parameters:	Pressure drop.
Fuel Burned:	Coal
Soot Blowing or Ash Pulling:	As necessary.
Rationale for Worst Case:	Anticipate normal operations.
Normal Operating Capacity:	50-65 MW

Boiler and Pollution Control Monitoring Description:

The power boiler will be operated at its normal generating level with MW load and steam generation rate recorded during the test period. In addition, CEM's will record hourly SO₂ emission rates and opacity levels.

Emission Source 11:

Process Equipment:	Crude ore crushing.
Process Operating Rate During Test:	Normal 400-600 TPH.
Control Equipment:	Bag house.
Control Equipment Operating Parameters:	Pressure drop.
Rationale for Worst Case:	None
Normal Operating Range:	15,000 ACEM @ 77° F rated.
Air Pollution Control and Process Monitoring:	Tons crushed during test period will be recorded.

Emission Source 22:

Process Equipment:	Dry Cobb magnetic separation.
Process Operating Rate During Test:	Normal.
Control Equipment:	Bag house.
Control Equipment Operating Parameter:	Pressure drop.
Rationale for Worst Case:	None
Normal Operating Range:	67,000 ACFM @ 77° F rated.
Air Pollution Control and Process Monitoring:	Tons processed during test period will be recorded.

Emission Source 48:

Process Equipment:	Bins storage crude crushed ore.
Process Operating Rate During Test:	Normal 150-200 TPH.
Control Equipment:	Multiclone.
Control Equipment Operating Parameters:	None
Rationale for Worst Case:	None
Normal Operating Range:	67,000 ACFM @ 77° F rated.
Air Pollution Control and Process Monitoring:	Tons processed during test period will be recorded.

Emission Source 76:

Process Equipment:	Pelletizer furnace discharge rotoclone.
Process Operating Rate During Test Period:	Normal 230-250 TPH.
Control Equipment:	Rotoclone.
Control Equipment Operating Parameters:	None.
Rationale for Worst Case:	None.

Normal Operating Range:	32,000 ACFM @ 750° F.
Air Pollution Control and Process Monitoring:	Tons processed during test period will be recorded.

Emission Source 101:

Process Equipment:	Pelletizing furnace hood exhaust.
Process Operating Rate During Test:	Normal 230-250 TPH.
Control Equipment:	Wet wall electrostatic precipitator.
Control Equipment Operating Parameters:	Secondary volts, primary amperes, spark rates and water flow.
Rationale for Worst Case:	None.
Normal Operating Range:	74,000 ACFM @ 150° F..
Air Pollution Control and Process Monitoring:	Tons processed during test period will be recorded as will the above operating parameters for the WWESP.

Emission Sources 104-107:

Process Equipment:	Pelletizing furnace waste gas.
Process Operating Rate During Test:	Normal 230-250 TPH.
Control Equipment:	Wet wall electrostatic precipitators.
Control Equipment Operating Parameters:	Secondary volts, primary amperes, spark rates and water flow.
Rationale for Worst Case:	None.
Normal Operating Range:	93,000 ACFM @ 150° F.
Air Pollution Control and Process Monitoring:	CEM's measuring SO ₂ and NO _x on one stack per furnace and tons processed during test period will be recorded as will the above operating parameters for the WWESP.

PART IV TEST METHODS

- A. EPA Method 1 for the location of sampling ports and points. Location of the sampling ports must be approved before the test.
- B. EPA Method 2 for velocity and volumetric flow rate. Three determinations: one measurement concurrently with each test run for pollutant.
- C. EPA Method 3. Three determinations; one measurement on an integrated sample taken concurrently with each test run for pollutant.
- D. EPA Method 4 for the determination of moisture in the flue gases. Three determinations: one measurement concurrently with each test for pollutant.
- E. EPA Method 5 for the determination of particulate matter. Three one-hour determinations will be performed. Condensible compounds will be collected during each determination and analyzed as per MN Rules Part 7005.0500. Results will be reported both as total particulate matter containing condensibles and total particulate matter excluding condensibles.
- F. EPA Method 6C for the determination of sulfur dioxide. Three one-hour monitorings will be performed.
- G. EPA Method 7E for the determination of oxides of nitrogen. Three one-hour monitorings will be performed.
- H. EPA Method 9 as amended in MN Rules Part 7006.1860 for the determination of opacity. Two hundred forty (240) observations during a one-hour period concurrent with one of the particulate runs by a certified reader.

PART V. CEMS RELATIVE ACCURACY

NA

PART VI OTHER

- A. Pollutants will be reported as GR/DSCF and LB/HR (LB/10⁶ BTU for the boiler).
- B. Description and date of last maintenance work done before the test. This information will be supplied as a part of the test report.
- C. One complete test report will be submitted within 45 days after the date of the test.
- D. One microfiche copy of the report will be submitted within 105 days after the date of the test.

INTERPOL LABORATORIES, INC.
(612) 786-6020

Test Log

Company
City

Cypress Northshore Mining
Silver Reef

Log No.
State

2971

MT

Date	Test No.	No. of Runs	Test Type	Source	Location	Elec. Field
5-24-94	1	3	pm/so ₂ /no _x /o ₂ /co ₂	No. 12 PELLETIZER Hood Ex.	INLET	ON
5-24-94	2	3	pm/so ₂ /no _x /o ₂ /co ₂	No. 12 PELLETIZER Hood exhaust	STACK	ON
5-24-94	3	3	Tm/o ₂ /co ₂	No. 12 PELLETIZER Hood exhaust	STACK	ON
5-24-94	4	3	pm	No. 12 PELLETIZER North Rotodur	INLET	-
5-24-94	5	3	pm/VE	No. 12 PELLETIZER North Rotodur	STACK	-
5-24-94	6	3	pm/so ₂ /no _x /o ₂ /co ₂	No. 12 PELLETIZER Hood exhaust	INLET	off
5-24-94	7	3	pm/so ₂ /no _x /o ₂ /co ₂	No. 12 PELLETIZER Hood exhaust	STACK	off
5-25-94	8	3	Tm/pm/so ₂ /no _x /o ₂ /co ₂	No. 12 PELLETIZER WASTE GAS	INLET	ON
5-25-94	9	3	pm/so ₂ /no _x /o ₂ /co ₂	No. 12 PELLETIZER WASTE GAS	INLET	off
5-25-94	10	3	pm/so ₂ /no _x /o ₂ /co ₂	No. 12 PELLETIZER WASTE GAS	STACK	ON
5-25-94	11	3	Tm/o ₂ /co ₂	No. 12 PELLETIZER WASTE GAS	STACK	ON
5-25-94	12	3	pm/so ₂ /no _x /o ₂ /co ₂	No. 12 PELLETIZER WASTE GAS	STACK	off
5-26-94	15	3	pm/so ₂ /no _x /o ₂ /co ₂	No. 11 PELLETIZER WASTE GAS	STACK	ON
5-26-94	16	3	pm/so ₂ /no _x /o ₂ /co ₂	No. 11 PELLETIZER WASTE GAS	STACK	ON
5-26-94	17	3	Tm/o ₂ /co ₂	No. 2 BOILER	STACK	-

Comments:

Test Log

CYPRUS
SILVER BAY

2971

74

Comments: